

# The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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## The Ponsard Regenerator.

The accompanying illustrations, for which we are indebted to *Iron*, show two sections of the Ponsard regenerator (or recuperator as the inventor calls it) and its position when applied to a furnace. As the cuts show, it consists of hollow or solid fire-brick, so built as to form two independent series of flues, through one of which hot gases pass, while the other serves for the heating of the air of combustion. Gas is made in an ordinary generator (see Fig. 1), and ascending upward mingles with the heated air of combustion near the fire-bridge of the furnace. Sweeping over the hearth the products of combustion enter a descending flue, which conducts them to the arch of the regenerator *a*, Fig. 3. They enter, in a highly-heated state, the compartments *b*, constituting one of the two flue systems, and in their passage, as indicated by the inverted arrows, impart much of their high temperature to the brickwork upon which they impinge. Gathering in a flue, *d*, at the bottom of the apparatus they are carried off to generate steam, should their temperature warrant such a use. The course taken by the air to be heated is exactly opposite. It enters the regenerator by a flue at the bottom and circulates in the compartments *c*, two of which are in some cases connected by hollow bricks, as Fig. 3 shows. The cold air in ascending strikes parts of the apparatus, increasing in temperature, and then taking its course upward out of the regenerator enters a flue leading immediately to an opening behind the fire-bridge of the furnace. The hollow bricks between the air compartments act as stays and greatly increase the heating surface, which Mr. J. S. Périsse estimates, in his paper read before the Paris meeting of the Iron and Steel Institute, at 10 square meters (107 square feet) for every cubic meter (35.31 cubic feet) of the regenerator. The hollow bricks are laid in alternate courses, so that allowance for expansion and contraction is made without any danger of disturbing their relative positions. In order to make the vertical joints tight, each connecting or stay brick has at the points of juncture a groove 1.18 inch by 0.16 inch, so that there is a hollow left for the mortar to fill as a lute-joint. The regenerator has the advantage of being continuous in its action, of being simple and durable, of great power and small volume. There are no valves costly in their first price and in their repairs. The duration of the apparatus varies according to its application. For welding furnaces about a year is a fair average. The system has been successfully applied in this country, and we understand that in one case at least a very important modification from the original was made. The square shape of the stay-bricks, it will be easily imagined, are very disadvantageous in their form, as they offer an opportunity for the deposit of a large amount of dust and ashes, which, acting as a non-conductor, injuriously affect the heating capacity of the plant. To obviate this these bricks have been given a rhomboidal shape, with the sharper angle, appropriately chosen to facilitate rapid sliding of the dust, pointing upward.

The following figures give the results of some applications of the regenerator. At the Pont-l'Évêque Forges a furnace was charged every 12 hours with 8 to 10 tons of piled iron, in nine to ten charges, for which the gas producer consumed about 4400 pounds of coal. Since work was started in 1874, the quantity of iron put into the mill for every 2200 pounds of rolled iron turned out has remained between 2380 and 2398 (general annual average); the saving of iron waste amounting to about 88 pounds per ton, compared with the ordinary furnaces which the Ponsard furnaces have replaced. The quantity of coal consumed (general annual average), including stoppages and relightings, was about 660 pounds per ton of rolled iron. The amount would be still less if the working were continuous, for the crisis in the iron trade necessitated whole days of stoppage every week, during which the gas-producer was kept going with fuel. These two furnaces cost together 20,500 francs (\$4000), not including the steam boiler. A case for the working of the regenerator when applied to the melting of spiegel is the following, taken from the Bessemer Works at Terrenoire and Besseges: One furnace served a Bessemer works of four

converters, 22 to 25 meltings of about 8 to 9 cwt. of spiegel each being made in 24 hours, the charge of cold spiegel, melting and pouring, lasting together 30 to 35 minutes. The gas-producer consumed nearly 2 cwt. of coal per hour, and during the intervals between the operations of the converters the furnace was heated as when working. The cost of melting in the Ponsard furnace was 10 francs less per ton of spiegel than in the cupolas. In addition to this saving there was the advantage of knowing exactly the quantity of manganese in the spiegel introduced into the converter, because in the Ponsard furnace the loss of manganese is most insignificant; it never exceeds a half unit out of twelve of the manganese contained, while in the ordinary reverberatory furnaces the loss is from 3 to 5 units, and in the cupolas 2.5 to 3.2 units on the same quantity of 11 to 12. The furnace has also been used in glass making at Blanzay, the director of the works, Mr. Videau, giving the following results, as obtained from 10 months' working with a 10-door open-hearth furnace. They worked from 10 to 11 hours a day and manufactured 5500 to 6000 bottles per furnace. The consumption of coal, containing 20 to 30 per cent.

of cinders, has only been from 137.5 to 192.5 bushels by the Ponsard furnace, not including the preparatory heating (*frittage*), which is done separately and requires 27.5 bushels. The pot furnaces in the same department (Saône-et-Loire) with only eight doors, and which can only be worked 8 to 10 hours, burn 275 to 302.5 bushels per day (including the preparatory heating) of mercantile coal containing from 12 to 16 per cent. of cinders. During this period of 10 months only one Ponsard regenerator has been employed, and

the waste flames leads theoretically to a saving of about 20 per cent. when the air is alone heated, and to a saving of 30 per cent. when there is double regeneration by the gas-producer fed by hot air. In addition there are other important economical advantages to be considered, which result principally from the diminution of waste caused by the great rapidity in heating obtained by the highest temperature

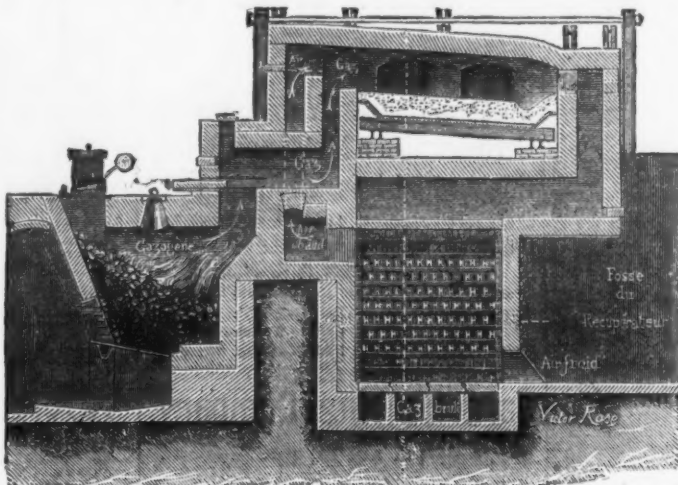


Fig. 1—PONSARD'S REGENERATOR IN POSITION.

which has been realized in the gas furnace. The facility with which the nature of the flame can be regulated to suit the nature of the matters treated, leads to a great diminution of waste in the furnace of these matters. It is sufficient to remember that for reheating iron the Ponsard furnaces economize nearly 900 pounds of iron per ton, which amounts to a saving of 100 francs per day in a furnace of medium production. In melting spiegel the diminution of waste in the furnace is very considerable, as proved

sard furnace, two pounds of steam can be produced for every pound of coal burnt in the gas producer.

## The Adelphi Verdict.

On the 10th inst. the coroner's jury impaneled at South Norwalk, Conn., to ascertain the causes of the death of the victims of the Adelphi boiler explosion, rendered their verdict. It is to the effect that the steamer's boiler exploded because of overwork and overpressure, legalized by a United States statute, increased after shiftless inspection, and persistently used by the attendants in charge after sufficient evidence of dangerous defects. The jury finds that the rules of supervising inspectors of steamboats governing their examinations are injudicious, and that the United States Revised Statutes covering this subject are unsafe in the extreme, and contrary to the best mechanical authorities both in this country and Great Britain. It finds that the United States inspectors allow about 75 per cent. more pressure than is the practice of other reputable mechanical authorities. It further finds that Inspector H. Birdsall in 1875 and Supervising Inspector Ad-

dison Low in 1876 allowed the boiler which exploded 37 pounds pressure per square inch when the limit should have been 36 1-10 pounds, and that Assistant Inspector Jno. W. Blake in 1877 still further increased this pressure to 40 pounds per square inch, contrary to law and without the semblance of a reason for so doing, and that he again in 1878 fixed the pressure at 40 pounds to the square inch a few months before the disastrous explosion; also that all the certificates of inspection of 1875, 1876, 1877 and the highest degree of responsibility in the care of this boiler in that he showed disregard of the United States law by not following the directions of the inspector in regard to certain repairs; also, that at the time of the inspection he did not report to the inspector, nor at any time since, certain serious defects; also, that he is guilty of gross negligence in that he intrusted important repairs to subordinates without his personal attention; and also, that he adopted and used for a considerable time varieties of repairs known to be unsafe and particularly objectionable to Chief-Engineer Pease, of the steamboat company; also, that the owners required of the Chief Engineer, Pease, by appointing him as captain of the steamer Grand Republic, duties which interfered with his proper oversight of the machinery of the various steamboats of the company, and by so doing did not use the degree of care which the public has a right to demand. The jury believes that the certificate of inspection was wrongfully obtained by the company's agents making false representations regarding repairs ordered by the inspector, and finds that there exist in the steamboat inspection service rules of mechanical practice at variance with the highest mechanical authorities; that a system of petty bribery is adopted by transportation companies in the issuance of inspectors of free yearly passes, passage and excursion tickets, and favors which are not granted to the general public; that of late years many inspectors do not use critical care by neglecting to employ their standard steam gauges in making their inspections of boilers; that the steamboat inspection service has not received the high respect which should be expected, but that the annual inspection is termed by some familiar with its workings merely a performance, and by others a farce. The jury recommends that boiler coverings be put on in sections, readily removable and easily handled. It also recommends to the appointing powers the highest degree of care in the appointment of inspectors, to the Secretary of the Treasury that the steamboat inspection service be thoroughly inspected by a competent commission, endowed with proper power, and particularly be freed of all political taint or bias. Two juries sat together to hear the evidence, and both agreed upon the above verdict.

## A Florida Ship Canal.

The people of Florida propose to build, or more probably to get the general government to build, a ship canal across their State from Matanzas inlet on the Atlantic to Fort Wool or Clay Landing on the Sevanee River, in order to shorten the passage from New York to New Orleans. It would have, it is said, an excellent harbor at each end of the canal, and no obstructions at either end. There would not have to be more than 75 miles of canal cut on this route, and then it would reclaim at least 1,000,000 acres of the best lands in the State. This land, when reclaimed, would be worth the price of cutting the canal, and the whole route would be well supplied with natural feeders. The distance from New York to New Orleans by this route would be much less than by any route further South. It would be from 1000 to 1200 miles less than the route now sailed, which would make a difference of from 2000 to 2400 miles saved on the round trip, and would save yearly \$5,000,000 in the way of shipwrecks, and \$3,000,000 annually in the way of extra insurance, over \$40,000,000 in freight, and several millions every year in the way of grain and meat which go to waste every year in the great Mississippi valley for the want of a cheap transportation to the seaboard. The canal, when built, would bring in a revenue of at least \$8,000,000 or \$10,000,000 annually in the way of tolls, especially when the Darien Canal is completed, as it would throw a vast amount of shipping from California, Japan and China through the Gulf of Mexico, and through the Florida Ship Canal, to New York and Liverpool and other parts.

The Superintendent of the Grand Trunk Railroad has issued another circular on total abstinence to the servants of the company, congratulating them on the success of the pledge system and urging the moderate drinkers to join the temperance society.

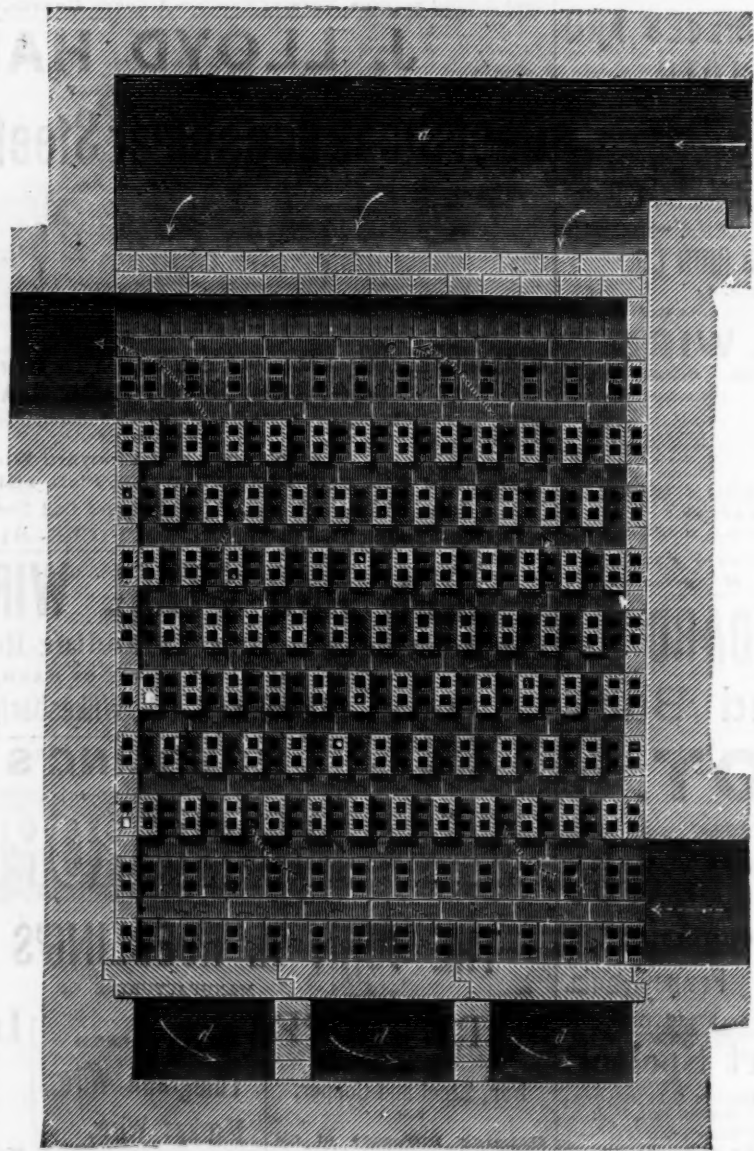


Fig. 2—LONGITUDINAL SECTION OF PONSARD'S REGENERATOR.

it was not necessary to have recourse to the spare regenerator. The economy realized, compared with the ordinary furnaces is, consequently, very considerable.

It appears from observations made on different apparatus which have been a long time in work, that the saving effected by the Ponsard furnaces has, compared to the ordinary furnaces, varied from 30 to 70 per cent. The recuperation of the heat contained in

by the figures quoted above for the Terrenoire and Besseges furnaces.

The cost of fitting up a Ponsard furnace is more than one-half less than for a corresponding Siemens furnace. In addition to it is claimed that it can be employed for producing steam by utilizing the burnt gases which are still hot when they leave the regenerator. It is stated that with Field's or Belleville's steam boiler adapted to the Pon-

1878 are false in declaring the longitudinal seams of the boiler to be double riveted; that the inspection of John W. Blake in 1878 was very superficial in many of its most vital features, and that he is guilty of gross negligence in the discharge of his duty; that James A. Howland, the engineer in charge, was a capable man in the ordinary care and management of the boiler, but that he accepted and assumed

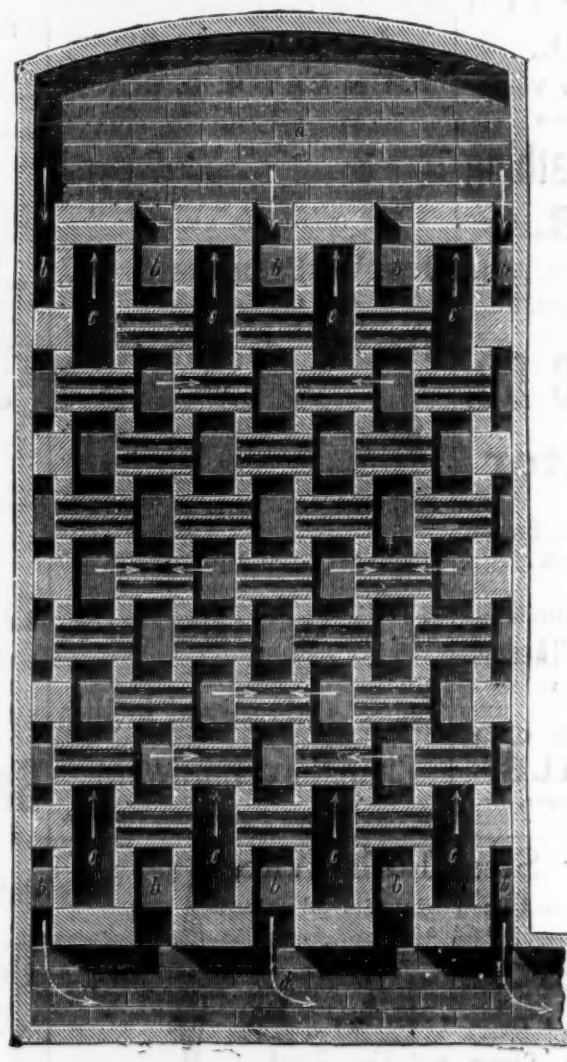


Fig. 3—CROSS-SECTION OF PONSARD'S REGENERATOR.



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SEE PAGE 9.

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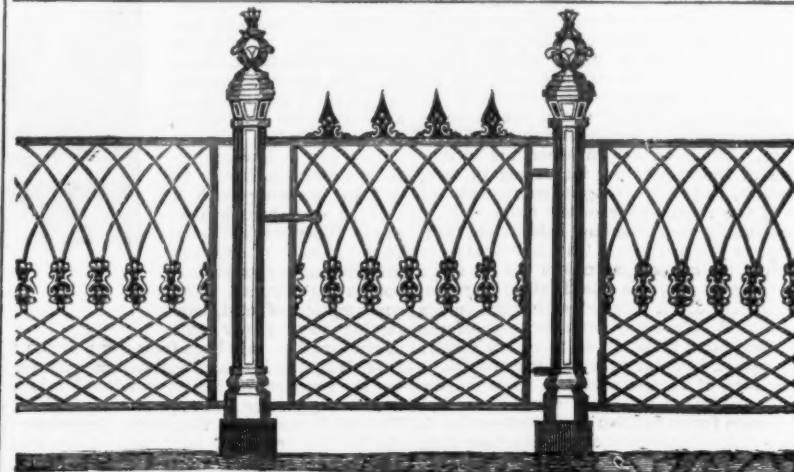
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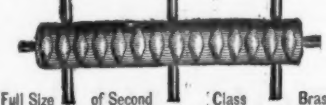
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# IRON AND STEEL INSTITUTE— PARIS MEETING.

On the Mechanical and other Properties  
of Iron and Mild Steel.

BY DANIEL ADAMSON, C. E.

Numerous experiments have been conducted by several eminent engineers to prove the tensile strength of iron and steel, both in the shape of bars and plates. Unfortunately, however, many of the tests have been carried out with rude testing machines, rendering it difficult to obtain a true result of the endurance and strength of the metal under investigation.

In addition to this a large proportion of the specimens tested have been of short lengths of metal, varying from 2 inches to 4 inches, and in all such cases a higher tensile strain has been noted than can be depended upon in practice, while the elongation has also been much over stated, a large proportion of the extension of the specimens arising from a contraction of area, or what in the present paper is called "breaking elongation."

With an accurate and sensitive testing machine, the maximum load is always carried in the mild ductile metals when about five-eighths of the elongation has taken place, the remainder, down to the point of breakage, is developed with a gradually reducing load.

Ordinary iron boiler plates and hard steels are an exception to this law, and nearly universally break with a maximum load, but with little or no reduction of area. The object of this paper is not simply to go over the same ground merely to prove by experiment the tensile strength of iron and steel, which would only leave us in the same condition as to the power to determine the suitability of a metal for any special purpose, but to take a larger and fuller view, always having a complete record of the composition of the metal under examination.

Having used practically a comparatively mild class of steels or ingot irons for the last 21 years, the writer has at times found from cold mechanical bending tests some irregularities in the working of such metals, which required a more careful investigation both as regards composition and the temperature at which they could be manipulated in the workshop and practically applied. One object is to put before the members the endurance of iron and steel when subject to concussive force, such as can be produced by gun cotton, gunpowder or other explosive materials. This is done partly with a view to understand what would be the effect on a steam boiler working under pressure by the side of an exploding boiler, or the effect on a ship by collision with another, and whether wrought iron or steel possessed the greatest power to resist such accidentally produced force. With this object a number of experiments were conducted by the writer in the month of June, 1876, by exploding gun cotton 12 inches above a series of iron and steel plates, varying in thickness from 3/4 to 7-16 of an inch. The iron plates tested were of best quality, the steel plates of a mild class, suitable for boiler and ship-building purposes.

All the iron plates subject to explosive test were 18 inches square by 7-16 inch thick, placed upon a cast-iron anvil block about 20 inches square, having a segment of a sphere gouged out on the top side, 10 inches diameter and 4 inches deep. Twelve inches above the plate 3 lbs. of damp gun cotton were fixed by a tripod of laths, attached to the cotton by two India rubber rings. Again, upon this was placed two ounces of dry gun cotton with a time fuse attached, to ensure a complete explosion of the damp compressed cotton. On the gun cotton exploding the iron plate was entirely broken through 10 inches in diameter, and the center piece forced down to the bottom of the anvil block, breaking up in an irregular line in the direction of the fiber, and to some extent across it. The same experiment precisely was conducted on a steel boiler plate, but only 3/4-inch thick. The steel plate after the explosion, with the same weight of gun cotton, and under exactly similar arrangements, was depressed 3 inches into the recess of the anvil block without the slightest sign of fracture or any apparent injury whatever. These experiments were repeated with the same result on 5 more best-best iron, and 5 mild steel plates, the latter being both of the Bessemer and Martin-Siemens system of manufacture. So far these experiments were conclusive in favor of mild steel to resist violent concussive force. With a view to get a full and more exact knowledge of the reasons why the iron plates broke up so much as compared with the mild steels, a further series of 30 experiments were carried out in September, 1877, operating upon 27 plates of varying quality, selected from the principal manufacturing districts—the iron plates of best and best-best boiler quality from Staffordshire, Shropshire and Yorkshire, including the Low Moor class; the steel plates both from the Bessemer and Martin-Siemens class of makers.

The mild steel again showed powers of resisting concussive force probably unequalled by any other metal that has ever been manufactured. Two steel plates had both been annealed previous to the first explosion, and the need of such annealing is illustrated by other steel plates, which cracked and broke up by the explosion, the broken plate being forced down to the bottom of the dish in the anvil. The writer is not aware how this plate was made, but the composition shows a very good quality of mild steel. From its appearance it had evidently been finished from the rolls at a low heat, and had a fine, smooth oxide steel surface.

The leading feature of the rupture of the iron plates, in the whole series of the experiments, may be said to closely follow in destruction the quantity of sulphur, phosphorus and cinder contained in the metal.

Further experiments were conducted with a view to test the iron and steel plates in question by drifting a washer cut from each plate in conjunction with the plates they were taken from. All the washers had a hole drilled in the center equal to the diameter of a rivet hole for the same thickness of

plate as used by the writer, and with an outside diameter equal to the lap of such a plate for single-riveted joint. The ordinary best-best boiler plates of varying qualities show an extension in the diameter of the hole by drifting from 27 per cent. to 50 per cent., while the best high-class Yorkshire plates endured drifting up to 91.5 per cent. before bursting. Passing on to the drift tests of the mild steel plates, the holes being 1-32 smaller to begin with, or 3/4 1-32, the outside diameter being proportionately less, agreeing with the thickness of the plates, the enlargement of the holes by drifting range from 133 per cent. to 187 per cent. These drift tests further illustrated the necessity of annealing.

The composition of the two mild steel plates that withstood the highest drift test both show a low measure of carbon, but the one had slightly less phosphorus than the other, and only a quarter as much sulphur, thus, to some extent explaining chemically that a higher endurance of drifting test is secured by the lowest measure of sulphur and phosphorus.

Innumerable records have been published giving the tensile strength of iron and steel; the quality as a rule has only been defined by the maker's name being attached to it, without any thought or care as to what the metal was composed of.

Great discrepancies have been pointed out by Mr. Kirkaldy in his published records, 1862, of an almost bewildering number of tests, which were carried out by him when he was with Messrs. Robert Napier & Sons, of Glasgow, between the years 1859 and 1861. It is stated on page 94, paragraph 50, being a summary of conditions, that "the startling discrepancy between experiments made at the Royal Arsenal, and by the writer (Mr. Kirkaldy), is due to the difference in the shape of the respective specimens, and not to the difference in the two testing machines."

A record of the experiments now illustrated clearly disproves and sets aside this conclusion, while a fuller investigation of the constituent elements of the metal will plainly explain the difference that is reputed to have arisen, by the variation in the shape or sections of the specimens tested. A series of tests were made with variable sections, but practically no difference was found—after the maximum strain was taken—arising from the difference in form. Tests made by the writer on round, square and rectangular bars, all show that variable sections do not alter the carrying power, the disturbing influence being entirely that of composition, coupled, no doubt, with more or less careful manipulation and work put upon the material. In making tensile tests of this character, short specimens of 2 to 4 inches are inadmissible, and at best misleading.

With a test of an elastic sample for a few inches a very large measure of the elongation is due after the maximum load has been carried, and which is called the breaking elongation, while the power to carry an undue load is illustrated by the small elongation at the two end inches, as supported by the stronger portions of the specimen that are in the grip boxes of the testing machine.

The following are the results of some experiments to determine the effect of drilling and of punching. The drilled plates carry a somewhat higher tensile strain through the line of hole as a rule, in proportion to the sectional area of the metal left, than a solid section of plate, no doubt the circle of the holes supporting the smallest section through their center line.

Numerous experiments have been conducted with a view to ascertain the force required to punch holes through a given thickness of plate, but without taking cognizance of the quality of the metal. To punch a hole through a steel plate, equal to a sectional inch of detrued area, may be found by multiplying the maximum tensile strength per square inch by 0.74 of the same metal, which will give the force required, the detrued area, meaning the circumference of the punch, multiplied by the thickness of the plate. This law may be depended upon both for the soft and the hard steels, and the total force to punch a hole through a hard plate, as compared with a soft one, may be said to accurately follow the law of its maximum tensile carrying power, so that a strong steel requires exactly a proportionate increase of force to punch a hole through a given thickness of plate as it does to pull it asunder.

After many trials and many failures in attempting to weld steel boiler plates, the writer found it necessary to ascertain in all cases the composition of the metal before putting any labor upon it, and from a large experience it is now considered desirable that the carbon should not exceed one-eighth of a per cent. while the sulphur and phosphorus should, if possible, be kept as low as .01, silicon being admissible up to the extent of a tenth of a per cent. Further experience is yet required to ascertain what exact composition gives the most satisfactory results by welding. At present some preference may be said to be given to the Martin-Siemens class as compared with Bessemer metal, when both are of about the same chemical composition. It is desirable that the worker of metals should have some experience of the best working heat of any iron or steel that may be under manipulation. A knowledge of the mechanical endurance at variable temperatures is also important to every one, as life and property depend so much on the efficiency of metallic structures. Few or no malleable metals, such as wrought-iron or mild steels, can be found in the open market that possess a range of endurance at all varying temperatures, say, from cold up to red heat, but nearly all ordinary bar or boiler iron and mild steels will endure considerable percussive force when cold, and up to 450° F., after which, as the heat is increased, probably to near 700 degrees, they are all more or less treacherous and liable to break up suddenly by percussive action. The poorer class of metals at this temperature, which may be called a color heat, varying from a light straw to a purple and dark blue, are simply rotten. Some of these peculiar properties are illustrated by a series of tests of various qualities of metal.

As the result of flanging and bending tests the writer has, during several years of observation, come to the conclusion that no



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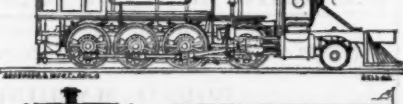
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Sole Manufacturers in U. S.

metal containing much above a trace of  
sulphur can endure bending at this color  
heat, while at the same time the phos-  
phorus must be low; in fact, such endur-  
ance can only be obtained by a compara-  
tively pure iron unalloyed by other ingredi-  
ents.

Mr. Adamson then gave the following re-  
sults on some experiments on corrosion, for  
which he was indebted to Mr. Rogerson, of  
the Weardale Iron and Coal Company,  
Limited, Spennymoor, Durham, who in-  
structed their chemist to test by corrosion  
three pieces of iron, and one medium hard  
and one soft steel plate, in a water bath con-  
taining one per cent. of sulphuric acid, for a  
period of seventeen days. The specimens  
subjected to test were 2 inches square by  
3/8-inch thick; the loss in weight by cor-  
rosion was recorded every twenty-four hours.  
The common iron in seventeen days lost 79  
per cent. of its total weight. Tudhoe Crown  
iron, one of the brands of the Weardale Iron  
and Coal Company's boiler plates, shows a  
loss in the same time of 46.4 per cent.  
Tudhoe best-best boiler plates lost in seven-  
teen days 13 per cent., while the soft Besse-  
mer metal only lost 4.8 per cent. At-  
tention may be called to the fact that the  
metal, according to the impurities of their  
composition, lost most in the least time.

A strange freak appears to have arisen  
on the second day with the soft steel, as at  
this point it had lost considerably more  
weight than the hard steel, but at the end of  
the fourth day the hard and the soft steel  
had lost about equal portions. From that  
period, however, on to the seventeenth day  
the soft steel did not lose as much as the  
hard metal by 8.2 per cent., and 74.2 per  
cent. less than the commonest iron in the  
same time.

The composition of these metals will be  
seen by referring to the following table:

|                           | Iron.  | Carbon. | Mang. | Silicon. | Sulphur. | Phos.  |
|---------------------------|--------|---------|-------|----------|----------|--------|
| Common Iron.....          | 98.8   | 1.0     | 0.177 | 0.008    | 0.593    |        |
| Tudhoe Crown Iron 98.90   | 98.90  | 1.0     | 0.107 | 0.007    | 0.217    |        |
| Tudhoe Best Best          |        |         |       |          |          |        |
| Iron.....                 | 99.00  | 1.0     | 0.216 | 0.111    | 0.165    |        |
| Medium H'd Steel 98.45    | 98.45  | 0.550   | 0.058 | 0.005    | 0.002    | 0.0075 |
| Bessemer Mid Steel 99.354 | 99.354 | 0.115   | 0.504 | 0.055    | 0.028    | 0.037  |
| Pure Iron.....            | 99.900 | nil     | nil   | nil      | 8/10     | 8/10   |
|                           |        |         |       |          | 0.040    |        |

From the experiments made on the prop-  
erties of iron and steel it will be apparent  
that the users of metals must, as it were,  
make some natural selection to secure the  
highest and best results for any special pur-  
pose; and it will also be clear that no  
wrought iron can resist concussive force  
equal to mild steel, and as a much higher  
range of ductility and carrying power is at-  
tained, it will force the attention of con-  
structive engineers to use it much more ex-  
tensively in all cases where strength and  
lightness are required.

Should it ultimately be proved that sea  
water will destroy steel quicker than  
wrought iron, we might continue the ap-  
plication of wrought iron for the skin of ships;  
but with our present knowledge nothing  
should arise to prevent the whole frame-  
work of every steamer and sailing vessel  
being constructed of Bessemer or Martin-  
Siemens steel, as at least one-third of the  
total weight may be saved with much  
greater security. In the diluted sulphuric  
acid bath the evidences are quite clear in  
favor of mild steel and the purest iron to re-  
sist corrosion, but before as much can be  
said as to the influence of sea or salt water,  
a more extended and careful series of ex-  
periments are required.

The same may be said of the selection of  
metals for the construction of artillery, and  
the writer has no doubt that by a still  
more careful manufacture to keep down the  
carbon and injurious alloying substances  
common to wrought iron, the most en-  
during armor plates might be manufactured  
by the pneumatic or Martin-Siemens process.  
Probably the pure iron, with a very low  
tensile strength, would appear to be the best  
adapted to withstand the shock of a cannon  
ball without breaking up; but whether such  
is worth carrying out by the "man of peace"  
may be a debatable question.

There can be no doubt that the medium  
hard class of steels, possessing double the  
strength of the best wrought iron that can  
be made, ought, without exception, to be  
applied to the purpose of bridge building and  
a variety of other similar structures. Up to  
this it has hardly found a place, and has  
had no consideration in proportion to its ex-  
cellency and intrinsic value.

Thousands of tons of this metal can be got  
from several eminent manufacturers of Bes-  
semer and Martin-Siemens steel, with a cer-  
tainty and regularity of composition far ex-  
ceeding that which can be accomplished with  
any class of wrought iron made by the pud-  
ding process.

The strength of a wrought-iron plate is  
seriously reduced when pulled asunder across  
the fiber in proportion to the quantity of  
cinder it contains. This unfortunate prin-  
ciple does not so much apply to bar iron, as  
the mixed cinder is rolled into streaks or in  
parallel lines with the bar, only slightly dis-  
turb the tensile strength of the iron when it  
is subject to a strain in one direction,  
hence a combination of good pig irons may  
be used and manufactured into plate iron,  
but the good material be spoiled by having  
too much cinder alone left in the iron, al-  
ways robbing it of its strength and endur-  
ance in one direction to resist a working load.

Cinder as mechanically mixed with  
wrought iron can be well seen by planing  
and polishing the end of a wrought-iron  
rail; the cinder is then shown to form dis-  
ruptive lines in the direction of the length  
of the rail, and when put to work under a  
heavy rolling load the iron breaks down  
laterally for want of cohesion, arising from  
an interposition of earthy matter.

The purity and superiority of a steel rail  
is made clear by subjecting it to the same  
treatment.

The test and illustration of the pure iron  
clearly indicates a low carrying power, but  
it is more than probable that such a metal,  
if worked down into thin plates, might be  
used in a large measure as a substitute for  
copper plates in the fire-boxes of locomotives,  
or better still, if the same qualities  
could be secured by the Bessemer and Mar-  
tin-Siemens process of manufacture so as to  
get rid of the last trace of cinder.

Ordinary merchant or Staffordshire iron,  
or a Cleveland bar, although only possessing  
a very small power to resist percussive force  
at a color heat, yet is much better adapted  
for the purpose of a chain cable or a rod to  
suspend a steady load, and though such are  
comparatively impure as iron, they possess  
a much higher tensile strength than the  
purest wrought iron found.

It is true these impure irons are not  
adapted for the manufacture of fowling  
pieces or rifles, as by quick firing a color  
heat may be approximately developed, the  
gun barrel being then liable to burst and fly  
in pieces, thereby jeopardizing the life of the  
user. At all times it will be well for both  
the sportsman and soldier to remember, if  
quick firing is desirable or demanded, that  
the gun or rifle barrel should not be allowed  
to get unduly hot. The same consideration  
should be given both in the selection of  
metal for the construction of cannon, and  
in some measure in the use of artillery.

Probably one of the best applications of  
the soft pure iron is to use it for stamping  
purposes, such as the manufacture of the  
details of gunlocks, where an easy flow of  
metal at a plastic heat is desirable, and the  
articles when finished will bear case-hard-  
ening without flaw or breaking up. The strong  
metals that will carry the highest tensile strain  
and possess great resisting power must be  
carefully treated in the manufacture or the  
whole of its advantages may be turned to  
destruction. No violence is admissible, and  
the action of cold punching in such cases  
ought forever to be abandoned; and ac-  
cording to the writer's experience, cold  
punching at all times is a barbarous system  
of rude manufacture that oftener than is  
suspected leads up to destruction.

The color heat tests ought to be impress-  
ed upon all workmen to prevent the hammering  
of metals when half cold, or the heating of  
iron by red-hot iron for some final adjust-  
ment; where hammering is required it  
would be a better and wiser policy to only  
heat the iron with boiling water, or by ap-  
plying steam against the surface a short  
time.

Finishing forgings or smith's work by  
hammering at a black heat at all times  
proves highly injurious unless great care is  
afterward used in annealing, and it is  
questionable then whether the full measure  
of strength of the metal in many cases is ul-  
timately restored.

This dangerous temperature can also be  
produced by allowing engine fly-shafts, rail-  
way carriages, axles, and such articles to  
become hot, and boil off the grease or tal-  
low, or for want of lubricants attain a tem-  
perature at which they are most liable to  
break down. In all such practical opera-  
tions the work should be stopped and the  
metal left to cool.

In the case of steel fly shafts, cooling by  
water of a hot neck has a tendency to split  
the shaft in the journal and produce trans-  
verse cracks that when afterward put to  
work cause it to break down disastrously.

The strength of the purest iron, no doubt,  
is seriously interfered with at about 600° F.,  
and especially its power to resist percussive  
force, but in what way the cohesion of the  
particles are disorganized at a temperature  
midway between a cold bar and a moderate  
working red heat may not be easy to de-  
scribe; but such being the fact, the greatest  
care should be exercised in all such ordinary  
practical operations.

**Mortgages on Philadelphia Real Estate.**

The Philadelphia Record says: There are  
about 120,000 unsatisfied mortgages on prop-  
erty in the city of Philadelphia, of which  
nearly two-thirds are held by building and  
loan associations. First-class mortgages at  
the present time are as scarce as snow in  
July. This shows, according to Craig P.  
Ritchie, of the Real Estate Title Insurance  
Company, a well-known expert in real es-  
tate matters, that nearly seven-eighths of  
all the property in the city is mortgaged.  
There are about 150,000 to 160,000 lots of  
ground built upon in the city, including the  
suburbs.

Previous to the year 1866 there were but  
few mortgages as compared with those of  
after years. The first book to contain a  
record of the mortgages was made in the  
year 1746. Previous to that year mortgages  
and deeds were entered in the same book.  
The increase in the number of mortgages  
from year to year has been astonishing.  
Each book in the recorder's office contains a  
record of about 185 mortgages on an aver-  
age. During the term of Hon. Alfred C.  
Harmer as Recorder of Deeds, from the year  
1860 to 1863, there were 72 of these books,  
showing that nearly 9000 mortgages were  
created in those three years by this reckon-  
ing. In one term of Louis R. Broomall,  
from 1863 to 1866, there were 97 books; in  
Joshua T. Owen's term, from 1866 to 1869,  
the number of books nearly doubled that of  
his predecessor, reaching 183; in John A.  
Houseman's term, from 1869 to 1872, the  
figures crept up to 295 books, while in the  
term of F. Theodore Walton, from 1872 to  
1875, the books reached the enormous figure  
of 315, showing that about 53,000 mortgages  
were created during Mr. Walton's term and  
entered on record. The term of David H.  
Lane, which expires next January, will  
show about the same number and perhaps a  
slight increase over the figures given above.

The greatest period of activity in the real  
estate market during the past eighteen years  
was that immediately following the close of  
the war and up to the beginning of the panic  
of 1873. Each book of deeds contains the  
record of about 200 properties. In Alfred C.  
Harmer's term, from 1860 to 1863, there  
were 129 books; in Louis R. Broomall's  
term, from 1863 to 1866, there were 232  
books; in Joshua T. Owen's term, from  
1866 to 1869, 299 books. In the term of  
John R. Houseman there were 292 books,  
while during the term of F. Theodore Wal-  
ton they fell off to 245 books, and in the last  
three years to 200 completed books.

The Belgian correspondent of the Iron-  
monger writes in one of his last letters that  
American edge tools for husbandry and farm  
purposes are working steadily into that coun-  
try, whereas the old Sheffield brands are al-  
most totally disappearing. The metal trade  
in Belgium is dull at the present moment,  
but the prospects are looked upon as en-  
couraging.



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It is made of  
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and Covered with  
a Perfect Glaze  
of Unquestionable  
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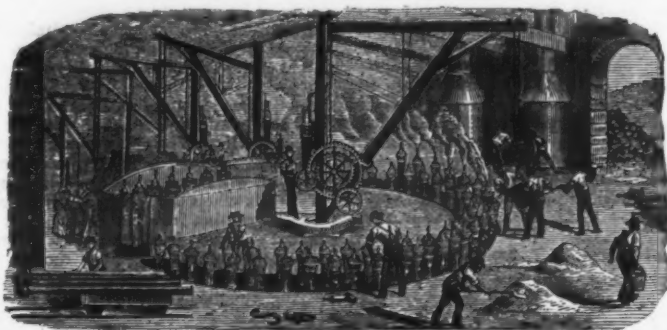
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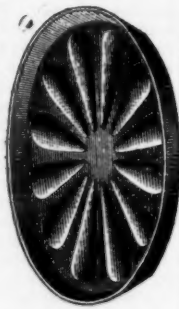
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The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and seems destined to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 lbs. weight, suitable for land or water to any part of the world.

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Proprietors of the Sewanee mines, capacity of 50,000 bushels of coal and coke per day.  
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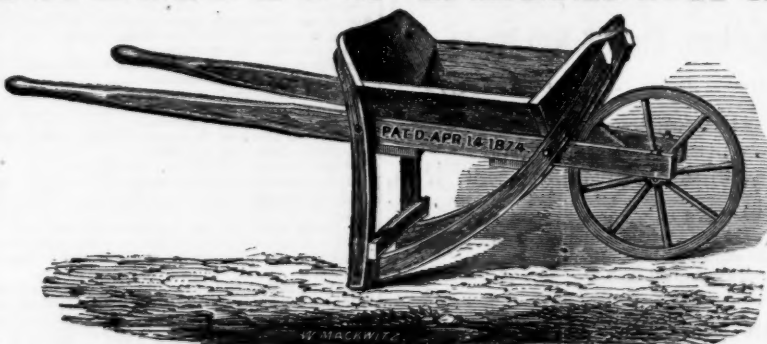
A superior article delivered at low figures at any  
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All shapes, small and large, including

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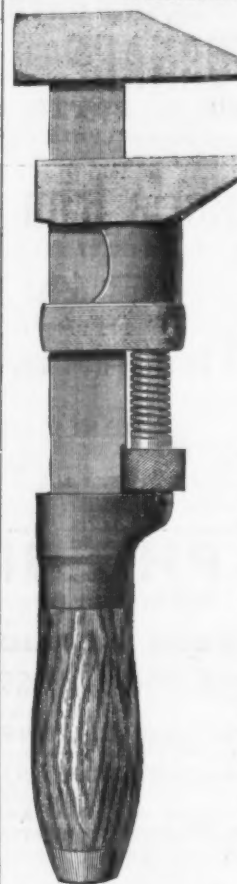
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IT HAS  
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Owing to the in-  
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after stamp all our  
goods.

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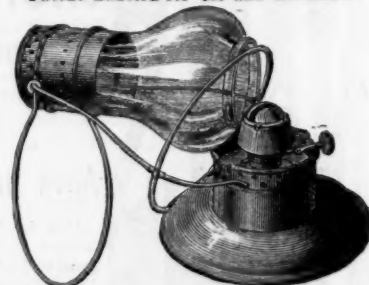
With this tool choice grapes and other  
fruit can be detached from the branches and  
deposited in the receptacle for receiving  
them without touching them with the  
hands.

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Patent Lantern for Oil and Kerosene.



This Lantern is the most salable in the market;  
it burns Kerosene or Oil with superiority. The  
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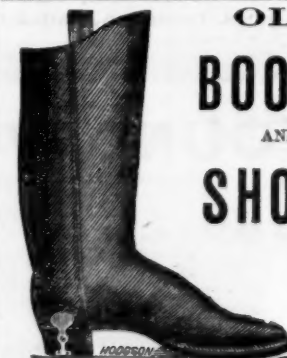
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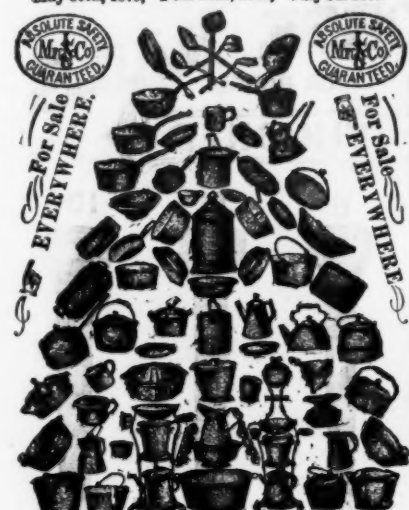
is acknowledged by all who have used it to be the  
Best Hand Corn Sheller made.  
These facts are attested by over 70,000 Farmers  
who have bought and used them.  
Send for prices.

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## PUMPS. HYDRAULIC RAMS, GARDEN ENGINES

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IN THE  
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Awarded the GRAND MEDAL OF PRO-  
GRESS at WORLDS' EXPOSITION, VIEN-  
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Pumps, &c., also, highest medal at PARIS  
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LOOSE PIN REVERSIBLE,

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Drilled and Wire Jointed.  
Japanned, Figured, Enameled, Nickel Plated  
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## IRON & BRASS PUMPS,

Clsters, Well, and Force Pumps, Yard, Drive  
Well, Garden Engine and Steam Roller Pumps,  
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improvements.

## Centennial Spring Hinges.

This Hinge has two flat coil  
springs, very powerful. It has a heavy  
solid pin, giving much less fric-  
tion than a hollow pin. It has  
broad, solid bearings in the knuckle,  
which do not wear down readily and  
let the door sag. It is Fast Joint,  
therefore can be used for either right  
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Fine Castings a Specialty.

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TWO FIRST MEDALS, and TWO DIPLOMAS OF MERIT

The following are the points that the Judges officially announce as the basis of their award of the  
highest honors to the Howe Scales:  
1st. For their Protected Bearings (the Howe is the only Scale with Protected Bearings), which makes  
the Scale DURABLY ACCURATE.  
2d. For their Simplicity.  
3d. For their Economy in Construction.  
4th. For their Economy in Material and Workmanship.  
5th. For their first-rate Material and Adaptations (which being patented are exclusively  
possessed by the HOWE).

## The Improved Howe Scales

MADE BY THE

## HOWE SCALE COMPANY, of Rutland, Vt.,

Are Guaranteed Superior to all others.

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LETOILE,  
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WHITE MOUNTAIN,  
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stones gotten up or labeled in  
any style desired. Price and  
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Our Stones are of good gran-  
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## METALLIC SHINGLES.

We call the attention of all par-  
ties interested in Roofing, and the  
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above article. It is superior to  
slate, cheaper, fire proof, about one-fourth the weight,  
lays much closer, therefore is storm proof, cannot  
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description and Price List to Iron Clad Manufac-  
turing Co., 10 Greenpoint Av., Brooklyn, E. D.  
P. O. Box, 258, N. Y. City.

## A Steel Ship.

The London Times gives the following  
particulars of the late trials of Her Majesty's  
ship Iris:

Whatever doubts may have been enter-  
tained with respect to the speed perfor-  
mances of the Iris, steel dispatch vessel, were  
conclusively set at rest by the long and  
varied trial to which she was subjected on  
the measured mile in Stokes Bay. She was  
proved to be not only the quickest ship in  
the navy, but the quickest ship afloat, hav-  
ing surpassed the highest speed realized by  
the Lightning, torpedo vessel, and even out-  
stripped the most sanguine expectations of  
Mr. Barnaby, her designer. The Iris was  
in every respect an essentially experimental  
craft. There was nothing resembling her  
in the service with reference to the propor-  
tion of midship section to length, the ex-  
treme fineness of her entrance and run, and  
the ratio of her enormous horse power to  
displacement; and as a result there were  
only very imperfect data to guide the Con-  
structive Department as to her probable  
performances from the actual performances  
of previously existing ships. It was, there-  
fore, necessary to obtain a constant for  
guidance hereafter, and to establish her co-  
efficients, and this was rendered all the more  
indispensable seeing that the Mercury, a  
sister vessel, in which everything has been  
sacrificed to speed, was being rapidly  
brought forward at Pembroke. The results  
of her first trial at Portsmouth were un-  
doubtedly disappointing. Mr. Barnaby had  
calculated that, with the engines developing  
7000-horse power, a speed of 17½ knots an  
hour might be realized; but the fact re-  
mained that, while the engines indicated  
500 over the contract power, the full power  
runs only gave a mean speed of 16.6 knots,  
the revolutions per minute being 91.  
There were, however, grounds for think-  
ing that the comparative failure was due,  
not to the form of hull, but to some defect  
in the machinery. The Iris was propelled  
by two four-bladed screws, each 18½ feet  
in diameter, with a pitch of 18 feet, the  
joint disc area being considerably greater  
in proportion to the engine-power than is  
common in single-screw ships, while the sur-  
face of the blades was also exceptionally  
large. On the trial it became evident that  
the engines were overweighted by the screws,  
and that the friction and drag which were  
set up materially detracted from the effec-  
tive power of the machinery. It was accord-  
ingly arranged, for experimental purposes  
only, to remove two of the four blades on  
each fan and to make a series of progressive  
trials, in order to see what improvement  
would result from a reduction of the blade  
area and a consequent relief to the engines.  
According to an analysis which has been  
made by Mr. W. H. White, of the Admiralty,  
the highest power developed under the novel  
conditions was 4369 horses, the corresponding  
speed 15½ knots and the revolutions 89. With  
the four bladed screws, 15½ knots had re-  
quired 5250-horse-power, and 4369-horse-  
power would have sufficed for 14½ knots  
only. It was not considered desirable to  
press the experiment of two-bladed screws  
by running at any higher speeds, nor by their  
form or pitch were they adapted for use as  
two-bladed propellers; but enough had been  
done to show that the performance of the  
ship could be greatly improved by a modifica-  
tion in the size of her fans. The purpose of  
the trial last Wednesday was to practically  
test the accuracy of the deduction. This ship  
was in charge of Captain Jones, and the  
trial was superintended by Mr. Nathaniel  
Barnaby, Director of Naval Construction;  
Mr. J. Wright, the Engineer-in-Chief at the  
Admiralty; Mr. Icely, of the Steam Reserve;  
Mr. Durston, of the Factory Department;  
and Mr. George Thompson, the chief engi-  
neer of the ship. Mr. Froude, Jr., and Mr.  
Brunel were again in attendance for the  
purpose of taking electric diagrams of the  
performances of the engines, the force of  
the wind, &c. The ship was trimmed by  
ballast and coal to 15 feet 8 inches for-  
ward and 20 feet 6 inches aft, which was  
near about her load line; and the new ex-  
perimental four-bladed screws were 16 feet  
3 inches in diameter, and had a pitch of 20  
feet. While the diameter had been reduced  
the pitch had been increased, the ratio of  
screw disc to area of midship section being  
thus much less than on the original trial.  
The blades were smoothed to prevent fric-  
tion, and conical caps had been tapped  
into the bosses over the nuts which secure  
the screws to the shafts for the purpose of  
preventing the wave which has been found  
to follow a bluff ending, whereby the resis-  
tance against which the ship has to contend  
in passing through the water is augmented.  
The result of the trial was in every respect  
more than satisfactory. Four full-power  
runs were made on the mile with the fol-  
lowing surprising results: Steam at engines,  
62 lbs.; vacuum, 27 inches; revolutions, 96  
starboard and 98 port; horse power, 7,734-  
85; speed of vessel, 18.572 knots. The en-  
gines thus developed fully 700 horses more  
than the contract, while the ship realized  
two knots in excess of the speed obtained  
from the larger screws, and fully a knot  
more than the Constructive Department  
anticipated to get out of her. Four runs at  
16½ knots gave 5132.16-horse power with  
86 revolutions. This, as will have been  
seen, was the utmost speed realized at the  
original trial with 7500-horse power and 91  
revolutions. Two runs at 12 knots gave  
1837.14-horse-power with 62 and 60 revolu-  
tions; and two runs at 8 knots gave 607.25-  
horse-power with 41 revolutions. The en-  
gines were also turned as slowly as possible  
with the steam at only a little above the at-  
mospheric pressure when the following data  
were obtained: Revolutions, 24 starboard  
and 19 port; vacuum, 28 inches; power in-  
dicated, starboard engines, 127; port, 59,  
making a total of 186 horses. There were  
scarcely any vibrations noticed, although at  
the previous trials the shaking of the ship  
was excessive. Altogether the performance  
of the screws and the ship were so satisfac-  
tory that further experiments are super-  
fluous, and similar propellers to those of the  
Iris will be fitted forthwith to the Mercury.

George Parker Bidder, F. R. S., an emi-  
nent civil engineer, who was known in early  
life as the wonderful "calculating boy,"

died recently at Dartmouth, England, in his  
73d year. He was associated with George  
Stephenson in the first railway enterprises  
of Great Britain, and has been prominently  
identified with the growth of the railway  
system.

## Imitations of American Hardware in the Brazilian Markets.

A correspondent of the Evening Post,  
writing from Rio de Janeiro under date of  
the 2d ult., says:

To secure to our manufacturers the full  
benefits of a successful introduction of their  
goods into Brazil the co-operation of the  
United States government has become of  
the greatest importance in the removal  
of one just cause of complaint—the wholesale  
counterfeiting of our goods and trade-marks  
by European manufacturers and their sale  
for genuine importations. In every in-  
stance within my knowledge the imitation  
is inferior both in make and material—in  
some instances so grossly inferior that its  
continued sale invariably results in driving  
the brand or trade-mark imitated out of the  
market. The counterfeit Singer sewing  
machine and Collins ax, both of German  
make, have been brought here and sold in  
large quantities, and the country is full of  
English cotton goods stamped as American.  
A few months ago a German canvassed this  
city with *fac simile* labels of every kind and  
description, the majority of them being so  
well executed that none but an expert could  
detect their falsity. In the present state of  
affairs it may be considered certain that every  
article of American manufacture successfully  
introduced here will invariably be counter-  
feited and undersold unless it is made so  
cheap that a counterfeit is impossible. There  
are Brazilian laws, of course, for the regis-  
try and protection of trade-marks; but in  
the absence of any treaty between the two  
governments specifically defining the recip-  
rocal rights and privileges of the persons  
concerned, we are wholly unable to derive  
any benefit from them. I am glad to say,  
however, that this disability is soon to be  
removed from our commercial relations with  
Brazil, and that the first step has been taken  
by Secretary Evarts. I am authorized by  
our Minister, Mr. Hilliard, to say that in ac-  
cordance with instructions he has consulted  
the Brazilian government on the subject of  
a commercial convention for the reciprocal  
protection of trade-marks, &c.; that the  
Brazilian government has expressed its will-  
ingness and desire to enter into such a con-  
vention, and that the preliminary steps have  
been taken for its early consummation.

Profits at the Paris Exhibition.—The  
Rappel of Paris undertakes to estimate the  
value to the capital of the world's fair of  
France now being held there. It says that  
the receipts for admissions, from the opening  
in May up to September 13, were 8,665,054  
francs, the rush in September being so large  
as to promise to swell the total to 10,000,-  
000 francs. The Rappel estimates that the  
total receipts by the end of October will be  
13,000,000 francs. There are to be added  
the following sums in francs:

|  |            |
|--|------------|
| Alienation of materials from the Champ<br>de Mars.....                   | 7,000,000  |
| Contribution by the city of Paris.....                                   | 6,000,000  |
| Repurchase of the Palace of the Troca-<br>dero by the city of Paris..... | 3,000,000  |
| Tax on the cafes and restaurants in the<br>park.....                     | 4,000,000  |
| Receipts from the Trocadero concert.....                                 | 1,000,000  |
| Total.....   | 21,000,000 |

This would make the total receipts of the  
Exhibition 34,000,000 francs. The total  
cost is fixed at 45,300,000. The balance  
sheet of the Exhibition therefore will show  
a deficit of 11,300,000 francs. But against  
this is to be set the fact that the revenue  
from indirect taxes has increased already  
51,000,000 francs, and will in the course  
of the year increase 70,000,000, principally in  
consequence of the world's fair, whereas the  
increase was estimated in the budget at only  
10,000,000 francs. This would leave about  
60,000,000 francs to the credit of the Exhi-  
bition, to say nothing of the advantages which  
trade and commerce have derived from the  
fair.

Mount Vesuvius Railroad.—There is a  
prospect of the railway up Mount Vesuvius  
becoming a reality within a not very remote  
future. The plans submitted by the banker,  
M. Obliet, have been approved by the de-  
partment of public works, and the necessary  
"concession" has been made by the prefec-  
ture of Naples. It is hardly necessary to  
say that the carriages on this railway will  
be drawn, not by a locomotive engine, but  
by a wire rope. The line will be double.  
The rails will be laid on an iron framework  
supported by pillars, also of iron. The pil-  
lars will be a little over 6½ yards apart.  
According to the report upon the plans, it  
appears that the length of the railway up  
the mountain will be almost 9½ miles. The  
station near the summit will be nearly 460  
yards higher than that at the foot of the  
mountain, which gives the very steep gradi-  
ents of 1 in 2. The traffic will be carried on  
by eight carriages, each having room for  
four persons; these will be so distributed  
that while four are engaged in making the  
ascent the remaining four will be descend-  
ing the mountain. The carriages will be  
kept about 230 yards apart from one another.  
To guard against accidents, each carriage  
will be fitted with two newly patented au-  
tomatic brakes, which, should the rope hap-  
pen to break, will instantly stop the carriage.  
The wire rope will be previously tested by a  
strain equal to 64 times the weight of the  
carriages; and the whole machinery will be  
set in motion by two steam engines of 12-  
horse power each. There appears to be  
little doubt that in a few months the whole  
undertaking will be completed; and future  
visitors to Naples will be able to climb  
Vesuvius in a less fatiguing manner than is  
at present necessary.

The Gold Movement.—A dispatch from  
London, under date of the 12th inst., says:  
One hundred thousand pounds worth of  
eagles were bought for New York yester-  
day at a trifle over the Bank of England's  
price, but it is not thought likely that gold  
will be shipped to any extent at present, as  
the supply of bonds has improved.







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MANUFACTURERS OF

## Copper and Iron Tacks, Tinned Tacks, SUPERIOR SWEDES IRON TACKS

For Upholsterers' Use, Saddlers' Supply Card, Clothing, etc., etc.

## American and Swedes Iron Shoe Nails.

Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails, Copper and Iron Boat Nails,

Patent Copper Plated Tacks and Nails,

## FINE TWO PENNY & THREE PENNY NAILS,

Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, etc.

Offices & Factories at Taunton, Mass.

Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

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MANUFACTURED BY  
CRANE BROTHERS MFG. CO.,  
Chicago.

## The Upright Family Scale

PATENTED.



With Tin Dish.  
Weighing 15 lbs.  
by 1/2 lb.  
List \$16 per  
Dozen.

Liberal Discount  
to the Trade.

This Scale has an  
attachment for  
Taking the  
Tare. Just the  
thing for family use.

Manufactured by  
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## MEASURING TAPES.

Of Cotton Linen and Steel.

For all purposes for which Tape Measures are required.

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FINE TEMPERED STEEL BAND SAWS.

From 1/4 inch wide upward. Warranted tougher than

any other Band Saw. Catalogue on application

## PRIZE MEDALLISTS:

London, 1862; Oporto, 1865; Dublin, 1865; Paris, 1867; Moscow, 1873; Vienna, 1873, and only Award and Medal for Self-Coiling Steel Shutters at Centennial Exhibition, Philadelphia, 1876.

## CLARK & CO.,

ORIGINAL INVENTORS AND SOLE

PATENTERS OF

Noiseless Self-Coiling Revolving

## STEEL SHUTTERS,

FIRE AND BURGLAR PROOF.

Also Improved

## Rolling Wood Shutters

Of various kinds. Clark's Shutters are the Best and Cheapest in the world. Are fitted to new Tribune Building, Lenox Library, Delaware and Hudson Canal Co.'s Building, Transatlantic Steamship Co.'s new Dock, American News Office, &c., Posey County Court House, Mt. Vernon, Holt County Court, Oregon, Mo. Also to buildings in Boston, Cincinnati, Detroit, Janesville, Wis., Baltimore, Canada, &c. Have been for years in daily use in every principal city throughout Europe, and are endorsed by the Leading Architects of the World.

Office and Manufactory,

162 & 164 West 27th Street, N. Y.

## ANSONIA CORRUGATED STOVE PLATFORM

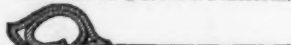
Manufactured by the

Ansonia Brass & Copper Co.

Office, 19 & 21 Cliff Street,  
NEW YORK.



Cut Showing Round Platform.



Section Showing Edge.

## ANSONIA Bronzed Fire Screen,

With Ornamented Mouldings.

PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or Shield, as shown in the illustration, is especially designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat. Being constructed of metal, with firm and substantial edges, curved in form to stand alone, it may be easily adjusted to any position about a stove, before a grate or fire place. The demand for something useful, durable and ornamental as a Fire Screen has long been felt, and having finally accomplished the desired result, we are prepared to fill all orders promptly.



## BROWN & SHARPE MFG. CO

Providence, R. I.,

MANUFACTURERS OF

## MACHINERY & TOOLS.

Gears Cut and Index Plates Made and Drilled to Order.

## PATENT CUTTERS FOR THE TEETH OF GEAR WHEELS

can be sharpened by grinding without changing their form. Cutters made on this plan will outlast many of the old form, with the advantage of being always ready

for use. If the cutter becomes dull before a wheel is completed, it can be taken out, sharpened and returned to its place in a few moments without risk of altering the form of teeth to be cut. Cutters for milling any irregular form made to order on the same plan. Parties having occasion to use mills for irregular shapes on sewing-machine, gun or other work, will readily see the advantage such cutters possess over those in general use, both as regards economy and convenience. Descriptive circular with price list sent by mail on application.



Patented  
January 4, 1876.

Patented  
June 13, 1876.

## PAYSON & CO.,

1319 to 1325 W. Jackson Street,  
Chicago, Illinois.

## RHODE ISLAND HORSE SHOE CO.,

OFFICE, 81 Canal Street, Providence, R. I. WORKS at Valley Falls, R. I.

Manufacturers of  
PERKINS and RHODE ISLAND PATTERNS OF  
HORSE AND MULE SHOES.

## Scientific and Technical Notes.

The English Mechanic gives the following description of

### GARRETT'S TORPEDO BOAT.

It is a cigar-shaped vessel, about 14 feet long by 5 feet in its greatest diameter. It weighs about 5 tons and floating at traveling level exposes a conning tower, which rises about 2 feet from the center of the boat. This tower forms the only hatchway of the vessel. It is square in section, fitted with windows and with a couple of short tubes closed by brass caps. A heavy lead keel keeps the boat in proper position, and it is propelled by a screw worked by treadle and fly-wheel. The boat is fitted with water-tanks, and is provided with a small but powerful force-pump, by means of which it can be submerged or raised to the surface. Iron bottles containing compressed air and oxygen form part of the stores, but the secret appears to be contained in the tin cases of chemicals used for revivifying the breathed air. One of these cases is strapped to the back of the operator and the expired breath is conveyed through a tube to the chemicals, which revivify it and return it to the atmosphere of the boat. When one case is exhausted another is adjusted, and the supply of oxygen is kept up by the assistance of the bottles, which form one of the indispensable stores. The bottles of compressed air are for the purpose of maintaining a suitable pressure within the boat. The torpedo gear is slung outside, and is reached by unscrewing the brass caps in the conning tower and passing the arms out through the closed sleeves which prevent the entrance of water. The speed of the boat is only 4 knots an hour. It is made of plates 3-16th of an inch thick.

One of the most curious contrivances shown at the Paris Exhibition is

### HALL'S DRILL FOR MAKING SQUARE HOLES.

He drills a square hole in metals or other substances with a rotary motion in one operation. For this purpose he employs a three-sided drill, either flat or fluted, which, in cross section, is of the form of an equilateral triangle. He makes the bottom or cutting edges of the drill perfectly flat, and three in number, each cutting edge extending from one of the outer corners to the center of the triangle. A special drill chuck, forming part of the invention, is provided, and attached to the lower end of the drilling spindle. The chuck is constructed in such manner as to admit of the drill traveling automatically in a horizontal plane some little distance. This is rendered necessary by the peculiar movement of the cutting edges of the drill, which does not operate or rotate on a fixed central point, but diverges somewhat in proportion to the size of the hole. Near to the lower end or cutting edges of the drill is fixed rigidly a metal guide bar or plate. The guide bar is provided with a square hole similar to the hole it is required to drill, the dimensions of the three sides of the drill being such that the distance from the base to the apex of the triangle, which such three sides form, is the same as of the sides of the square hole it is required to drill. The triangular drill for drilling dead square holes may also be used without the self-adjusting drill chuck in any ordinary chuck, when the substance operated upon is not very heavy nor stationary; then, instead of the lateral movement of the drill, such lateral movement will be communicated by the drill to the substance operated upon.

An Australian, Mr. F. Falkner, has invented an apparatus for nailing down flooring boards, which he calls a

### "NAIL GUN."

The apparatus is not unlike a gun in shape and is about the same length. It is kept in position with the foot and knee, and the nail to be driven is placed (point down) in an aperture at the top of the concern. It slides down to the bottom, and then the operator draws up a rod, and by one downward stroke of this the nail is cleanly driven into the boards beneath. A practiced hand, by this simple contrivance, could do the work of half a dozen men. Mr. Falkner is now improving upon his invention, and is making a "nail gun" which will be self-feeding.

Interesting observations have been made recently on the Cologne-Minden Railroad, Prussia, on the

### RUSTING OF IRON RAILS.

A pile of rails of odd lengths were laid on sleepers over a bed of gravel early in 1870, and remained undisturbed until the fall of 1877, there being no use for them. It was then found that they were covered with a layer of rust 12-inch thick, which had to be removed by striking the rail with a hammer. The cleaned rail weighed only 398.2 lbs., while its original weight was 419.1 lbs., showing that 5 per cent. of the iron had been destroyed by rust which covered the rail quite uniformly. This confirms the observation often made that rails stacked away are much more liable to rust than those laid down in a track.

A simple instrument has been devised by E. R. Dale, of England, for

### MEASURING THE DIAMETERS OF CIRCULAR CURVES.

It consists of a tube bearing at its lower end a fork, having in its center a feeler pressed against the curve to be measured by a spring contained in the tube. The upper end of the feeler is fitted with a small rack, gearing into a pinion of the spindle of a hand the motion of which indicates on a graduated disk the diameter of the circle of which the arc is a part. In order to measure with the instrument the central feeler is pushed inward until it is as well as the ends of the fork touch the arc to be measured.

Safety catches for cages in mines and for elevators in buildings are very numerous, and yet few are without their serious drawbacks. An ingenious contrivance for this purpose is

### COUSIN'S COUNTERPOISE CATCH,

recently adopted at the Bernisat pits in Belgium and in the mines of the Anzin and Douai companies. Its chief merit is that it is applicable to wire guides, which it does not injure when it comes into action. The catch proper is a wedge, forced into the loop encircling the guide rope by a spring as soon as the hoisting rope breaks. The

wedge is made of wood and is provided with steel points to insure its taking a hold on the guide rope in case of an emergency. In ordinary hoisting the wedge is withdrawn and the loop slides freely on the guide rope. The special feature of the apparatus is, however, the counterpoise arrangement. The guide rope is attached at the bottom of the shaft, but its upper end runs over two pulleys and carries at its end a series of counterweights placed one upon another, attached by chains. As soon as the winding rope breaks the wedge seizes the guide rope, which is drawn downward by the weight of the falling cage. This causes the counterweights to be lifted one by one until the cage has come to a stop, thus avoiding any injurious tearing strain upon the guide rope.

Otto Frankenau, an ingenious German, has invented a

### COMBINATION REVOLVER AND POCKETBOOK

which, in a country infested with footpads, might be a very convenient thing. The purse has the outward appearance of a somewhat thick portemonnaie, and the pistol is secured to the metal framework on the left-hand side when the muzzle is pointed forwards. On the right-hand side there are the ordinary pockets for money, and on the left-hand side the purse opens in the same way, to allow the pistol to be cleaned and loaded. By touching a spring in the framework a little trap-door opens and discloses the muzzle, while at the same moment the trigger falls down from below. The revolver has five chambers and Eley's five millimeter cartridges. The idea of the inventor is not only to afford a means of carrying a pistol without displaying it, but also that a thief might be shot in the very act of appearing to comply with his demand for money. The mechanism is very simple and works easily and well; and the pistol, although concealed, can be levelled with sufficient accuracy for its purpose as a weapon of defense at close quarters. In order to fire, a rather strong pull on the trigger is required, so that there is practically no danger of discharging the pistol accidentally when using the purse for its declared purposes.

There are two brick yards in the country, one at Washington and the other at Baltimore, with machinery for

### MAKING BRICKS BY STEAM,

which is stated to be very rapid and economical in operation. Each of these establishments is said to have a capacity of 200,000 bricks per day. The clay, after it has been passed through iron rolls, which pulverize the small stones and reject the large ones, is carried to the top of the building and thence falls into the disintegrator, which makes 450 revolutions per minute. Here it is reduced to a fine powder and passes off into a pipe, where, by the addition of steam, it is moistened enough to give to its particles the proper cohesiveness. This pipe feeds a wheel furnished with molds, which, in the two revolutions it makes each minute, turn out 232 bricks. As the wheel revolves the bricks drop out on to an endless belt which carries them to a shed some 50 feet away, where they are loaded by hand upon small cars, which are rolled over into drying ovens and allowed to dry there during five hours, the dampness in these ovens being constantly withdrawn by an exhaust fan. After this they are stacked in kilns and fired.

### Metallurgical Notes.

#### RESEARCHES ON FOUNDRY PIG.

It is well known to founders that some grades of iron, though otherwise very suitable for foundry purposes, develop large quantities of gas when they are cast, so that a second piece of work cannot be made from them. This proves all the more disagreeable because these irons are often valuable on account of their strength. Generally the formation of gas is attributed to sulphur, undoubtedly a frequent cause, especially as coke is often used containing that impurity. It seems, however, that there are other causes which in some instances produce phenomena hitherto insufficiently explained. A foundry in Silesia, Germany, lately employed a gray pig which when used directly after melting and cooled rapidly was white and porous, while after standing in the ladle for a while it was gray and sound. Analyses of both were made by Prof. Ledebur of the Freiberg School of Mines, who publishes the results in the *Berg u. Hütt. Zeitg.*, with an elaborate discussion of the causes. The analyses yielded:

|            |           |       |
|------------|-----------|-------|
| Carbon     | 3.614     | 3.382 |
| Silicon    | 1.285     | 2.009 |
| Phosphorus | not d't'd | 0.449 |
| Sulphur    | 0.022     | 0.024 |
| Manganese  | 0.031     | 0.278 |

The former was the porous, the latter the second iron. The experiments were repeated with the following results: No. 1 was gray pig making a sound casting at once; No. 2 yielded a porous one when cast directly, and a sound one when cast after a longer period of rest; No. 3 was a sample of the porous metal made from No. 2, and No. 4 a sound piece cast from the same.

|           | No. 1.    | No. 2. | No. 3. | No. 4. |
|-----------|-----------|--------|--------|--------|
| Carbon    | 3.300     | 3.572  | 3.504  | 3.473  |
| Silicon   | 2.453     | 2.309  | 1.495  | 2.106  |
| Sulphur   | not d't'd | 0.016  | 0.028  | 0.056  |
| Manganese | 4.135     | 4.041  | 2.968  | 2.620  |

It will be noticed that although the pig No. 1 and No. 2 are very similar in composition, they act very differently. The striking feature of both experiments is the great increase of the percentage of silicon in connection with the formation of a porous casting. In order to determine whether keeping the iron in the casting ladle affected the silicon with ordinary pig, the following determinations were made, Nos. 1, 3, 5 and 7 being cast at once, while Nos. 2, 4, 6 and 8, being cast at periods of rest varying from six to fifteen minutes. The first pair was taken at Freiberg; the others from three different mixtures at the Königin-Marien-hütte:

None of these irons, it will be seen, showed a decrease of the amount of silicon by re



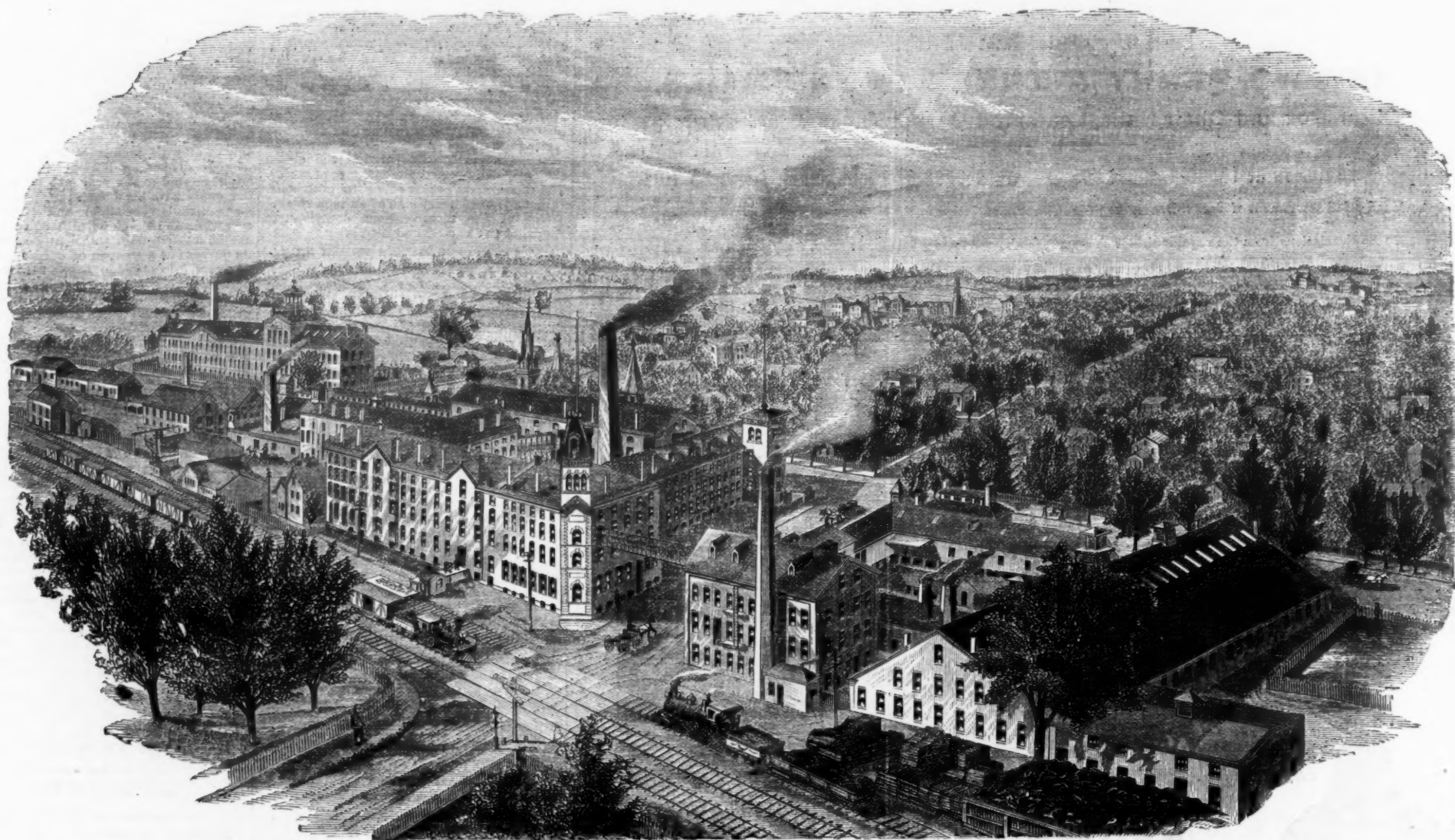
# RUSSELL & ERWIN MANUFACTURING COMPANY

**Manufacturers of HARDWARE.**

**FACTORIES, - - - - NEW BRITAIN, CONNECTICUT, U. S. A.**

**MANUFACTURERS' AGENTS AND DEALERS IN GENERAL HARDWARE AT OUR**

**WAREHOUSES: NEW YORK, 45 & 47 Chambers Street; PHILADELPHIA, 425 Market Street; BALTIMORE, MD., WM. H. COLE, Agent, 17 South Charles Street.**



*Screw Factory.*

*Packing Room, Offices and Main Factory.*

*Finishing Shop.*

*Iron Foundry.*

**WORKS OF**

**THE RUSSELL & ERWIN MANUFACTURING COMPANY,**

**NEW BRITAIN, CONNECTICUT, U. S. A.**

## IRON AND BRASS WOOD SCREWS.

**Our Screws are always for sale at LOWEST prices made by responsible manufacturers.**

**We do not guarantee prices.**

**ASSORTMENT COMPLETE, ORDERS FILLED PROMPTLY.**



## Cutlery.

## FRIEDMANN &amp; LAUTERJUNG,

Manufacturers of PEN AND POCKET CUTLERY.

Solid Steel Scissors, Shears, Razors,  
Russia Leather Strops, Hones, &c.

Sole proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"

And the celebrated "ELECTRIC SHEARS." Nickel Plated  
Hones.

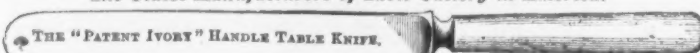
Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &amp;c.

1 Chambers and 73 Roade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

## MERIDEN CUTLERY CO.

The Oldest Manufacturers of Table Cutlery in America.



EXCLUSIVE MAKERS OF THE

## CELLULOID

HANDLE FOR TABLE CUTLERY. A most beautiful and perfect substitute for Ivory. Also makers  
of all kinds of TABLE, BUTCHER AND HUNTING KNIVES.  
Illustrated catalogues with prices sent to the trade on application. 49 Chambers St., New York.

ESTABLISHED 1835.

My Blades are forced by hand from the best Cast Steel, and warrant-  
ed. To me was awarded the Gold Medal of the Conn. State Agricultural Society.

## HALL, ELTON &amp; CO.,

Electro Plated Ware, German Silver and Britannia Spoons.



Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

## THE FRARY CUTLERY COMPANY,

FACTORY, BRIDGEPORT, CONN.

NEW YORK OFFICE &amp; WAREHOUSE, with WIEBUSCH &amp; HILGER HARDWARE CO., 84 Chambers St.

## Manufacturers of all kinds of Table Cutlery.



The above illustrations represent their New Patent Screw Tang Lock Fast Solid Handle Knife.

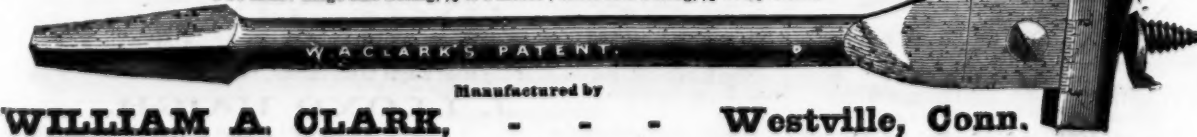
There is no question but that a solid handle Knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle  
has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand  
and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent  
screw tang. A wood screw is welded to the tang of the Knife or Fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong  
neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butcher and Carvers, and  
furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly,  
and very respectfully invite the attention of the trade.

## HOLROYD &amp; CO.,

Waterford, N. Y.



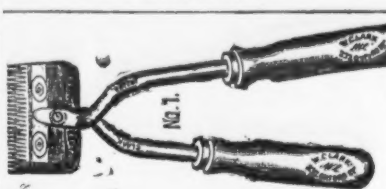
## CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other  
Two sizes: Large Size Boring, 1/4 to 3 inches; Small Size Boring, 1/8 to 1 1/4 inches.

Manufactured by

WILLIAM A. CLARK, - - - Westville, Conn.

## Cutlery.



## McCoy &amp; Co.,

134 &amp; 136 Duane Street, New York.

SOLE WHOLESALE AGENTS

## CLARK'S

## PATENT HORSE CLIPPER

Five styles. Fully described by our circular and  
price list, which we will send on application.  
The genuine are stamped on both the wooden  
and metal parts, as shown in the illustration, as a  
protection against inferior imitations.  
All repairs executed with care and dispatch.

## HERMANN BOKER &amp; CO.,

101 &amp; 103 Duane Street, New York,

SOLE AGENTS FOR THE

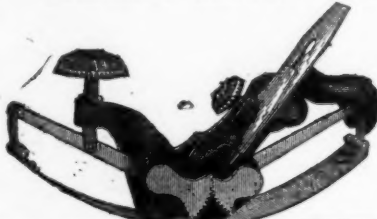
GARDNER PATENT  
POCKET KNIVESThe assortment of Gardner's Celebrated  
Barlow Knives has been increased, and they  
are now furnished with Rubber, Bone, Stag  
and Wrought Iron Handles.

All of Gardner's Patent Knives are fully warranted.



## STANLEY RULE AND LEVEL CO.,

MANUFACTURERS OF

Improved  
Carpenters'  
Tools.

New Britain, Conn.

WAREHOUSES,

29 Chambers St.,  
New York.

No. 113, Improved Adjustable Circular Plane - - \$4.00

## Cutlery.

## JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm &amp; Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &amp;c

AGENT FOR

WALTER SPENCER &amp; CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark.

) NO SPENCER  
ROTHERHAM

Granted 1777.

maining for a length of time in the casting  
ladle. Prof. Ledebur advances the opinion  
that the phenomenon is due to the presence  
of sulphide of silicon, which causes the blow-  
holes. He believes that by contact with the  
moist walls of the mold sulphuretted hydro-  
gen is generated, which escapes, and that  
silica is formed in a fine state of division,  
the latter being carried off by the escaping  
gases. Under the action of cooling in the  
ladle, silicide of iron and a sulphide are  
formed.

ANALYSES OF GROSSALMERODE FIRE-CLAY.  
As the fire-clay of Grossalmerode, Ger-  
many, is one of the most refractory sub-  
stances known, the following recent analysis  
will prove interesting. It was made by  
Bischof, who is one of the best informed  
chemists in this branch of investigation:

|                                 |       |
|---------------------------------|-------|
| Alumina.....                    | 34.52 |
| Silica chemically combined..... | 45.38 |
| Silica mechanically mixed.....  | 5.53  |
| Magnesia.....                   | 0.73  |
| Lime.....                       | 0.76  |
| Oxide of iron.....              | 1.66  |
| Potassa.....                    | 1.51  |
| Sulphur.....                    | 0.26  |
| Loss by ignition.....           | 11.04 |

Total..... 100.39

The slag was dried at 120 degrees. When  
exposed to platinum melting point it retained  
its shape, and the surface did not become  
glazed. Shrinkage in consequence of ex-  
posure to a red heat amounted to 11.5 per  
cent.

THE BERRENS QUICKSILVER FURNACE.

In a former issue of *The Iron Age* we  
called attention to the experiments made at  
Almadén, Spain, with the old Bustamante,  
the Idria and the Pellet quicksilver furnaces,  
stating how unexpectedly superior the work  
of the Bustamante system, now 232 years  
old, was found to be. Recently an apparatus  
constructed by Hippolyte Berrens has been  
submitted to practical test at Barcelona,  
Spain, by a commission of Spanish govern-  
ment engineers, and the results obtained  
were certainly such as to deserve the atten-  
tion of American metallurgists. We take  
from the *Correspondance Scientifique* the  
following description of the apparatus: It  
consists of a horizontal or vertical furnace,  
charged periodically, as its action is not con-  
tinuous. It connects with a transmission  
chamber, from which the gases pass into con-  
densers, 17 to 25 in number, the shape of  
which resembles that of two cones united at  
their base. The lower cone is buried in the  
ground, the upper, made of sheet iron, is  
cooled by a continuous stream of water.  
Each condenser has a capacity of about 30  
cubic feet. They communicate with one  
another at their lower parts. The last one  
of the system is connected with a chamber  
containing charcoal, destined to remove the  
last traces of mercury from the gases.  
There is no chimney, but an aspirator in-  
stead, which permits accurate regulation of  
the furnace. The walls of the apparatus  
are coated with a layer of a mixture of  
equal parts of charcoal powder and cement.  
The furnace at Barcelona was charged with  
15,717 pounds of 2.76 per cent. ore. Theo-  
retically, therefore, the yield should have  
been 455.39 pounds of quicksilver, but in  
fact it was 450.96, which proves a loss of  
0.79 per cent., although the carbon of the  
last receiver was not examined. Gold leaf  
placed at the end of the apparatus did not  
show the least trace of amalgam. A second  
trial was made to test the efficiency of the  
apparatus under the most trying circum-  
stances, and it is but just to state that both  
the experiments were made in summer, at a  
time when work at Almadén is entirely sus-  
pended on account of the too heavy loss of  
quicksilver. In this second trial the ex-  
hauster was run at so high a speed that the  
ore in the furnace was glazed; the time of  
the operation was decreased by 25 hours, and  
yet the yield from a charge of 15,790 pounds  
of 2.82 per cent. ore was 434.51 pounds, the  
loss amounting to 3.62 per cent. A hori-  
zontal furnace is now building at Anfo-  
deguilla capable of working 20 to 30 tons of  
1 per cent. ore per day.

CARVES' COOKING SYSTEM.

A correspondent of *Engineering* states  
that Carves' cooking system has been adopted  
at Besseges by the Terrenoire Company.  
The oven is of the ordinary Belgian pattern,  
with bottom and side flues, which are heated  
by the gas given off in coking. This, how-  
ever, is not burnt direct, the volatile pro-  
ducts of the distillation being first drawn by  
an extractor through a system of serpentine  
pipes and condensers analogous to those  
used in gas purification, when the tar and  
ammoniacal water are condensed, after  
which the purified gas passes over a grate  
fire at the bottom of the oven and is burnt  
for heating, the waste flame raising steam  
for the ram and other operations requiring  
power. The original ovens were about 32  
inches wide, but on rebuilding a series that  
has been several years in use, they have  
been reduced to 29 1/2 inches and 28 1/2 inches  
in order to get the interior of the coke more  
thoroughly carbonized. The time of burn-  
ing is about 72 hours; 1573 parts of coal  
yield 1000 of coke, the accessory products  
being 24.52 of tar and ammonia water, equal  
to 3.6 of sulphate of ammonia, about a ton  
of that salt being produced daily.

Panic in the Scotch Iron Trade.

GLASGOW, October 15.—There is a panic  
in the iron trade here, in consequence of a  
reported heavy failure and rumors of other  
suspensions. The prices of pig iron were at  
one time 10 pence per ton lower on the day.  
Later.—Wotherspoon, the well-known iron  
founder, has failed, with liabilities amount-  
ing to \$500,000.

Mr. C. E. Manby, an English analytical  
chemist, reports that he has discovered a  
new mineral in the mineral clay of Furness.  
From a paper on the subject read before the  
Barrow Naturalist Field Club, he says he  
names the new mineral vermicellite, owing  
to its similarity in many respects to the  
vermicellite of Pennsylvania, belonging to  
the mica group. The distinction between  
the two metals appears to be a great increase  
of ferric oxide in vermicellite, a decrease of  
alumina, silica and water, with the addition  
of new compounds, titanio and phosphoric  
acids, lime and soda.

## CORPORATE MARK.



## Joseph Rodgers &amp; Sons'

(LIMITED)

## CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. &amp; W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons'  
productions having considerably increased, they  
have, in order to meet it, greatly extended their  
Manufacturing Premises and Steam power.To distinguish Articles of Joseph Rodgers  
& Sons' Manufacture, please to see that they bear  
their Corporate Mark.

## I. R. SPENCER &amp; SON,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

## FILES

AND

## STEEL,

Table Knives, Razors, Shovels, &amp;c., &amp;c.,

of every description.

## CORPORATE MARK.



Granted 1749.

## ALFRED H. HILDICK,

12 Warren St., N. Y.

Importer of CHAINS, ANVILS, VISES, &amp;c.

Agency of  
HILL BROTHERS & CO., WALSALL, ENGLAND,  
GENERAL HARDWARE MERCHANTS,  
And of

## BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are unsurpassed for cheapness, dura-  
bility and utility. They are made of one solid piece  
of steel from point to point, and cannot be broken in  
use either in the bow or at the junction of the shank  
and blade. Samples can be seen at above address, or  
sample lots furnished.

## KRAUSS &amp; HAHN,

Importers, Manufacturers and Dealers

In all kinds of

## Cutlery and French Grindstones,

152 Centre, cor. Walker St., N. Y.

Ground sides Razors of all brands imported and  
conveyed by steam power for the trade. Price for  
conveying from \$5 to \$5 per dozen. Price list sent on  
application.



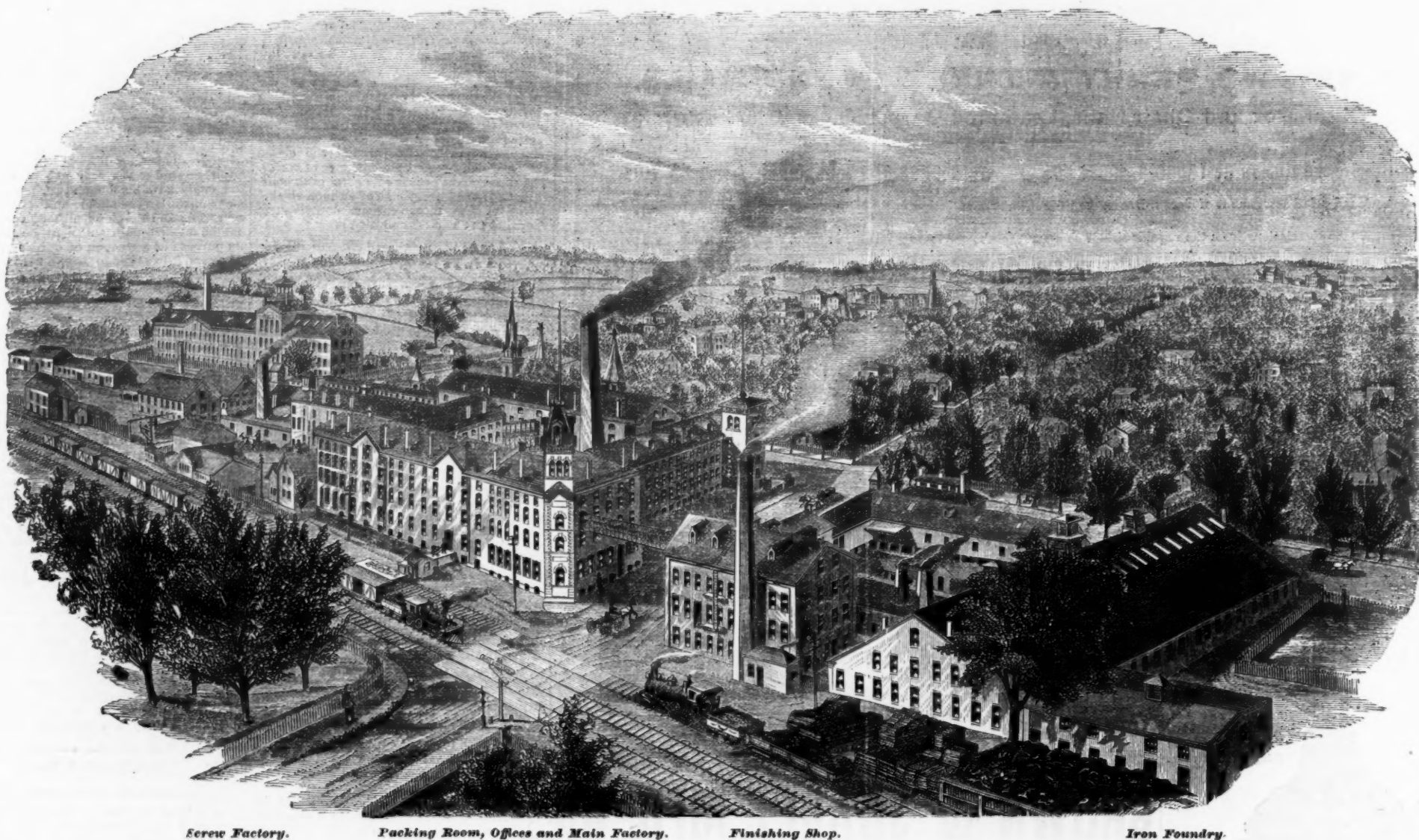
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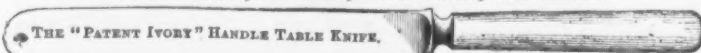
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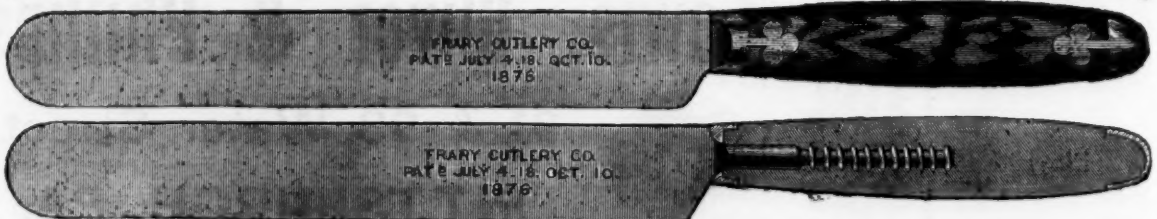
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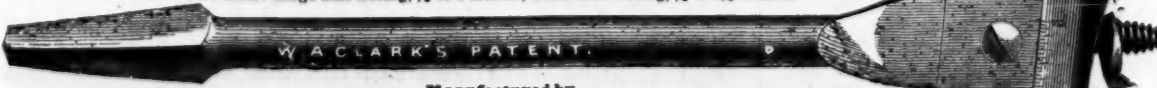
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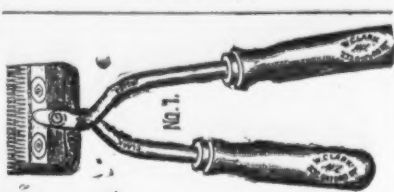
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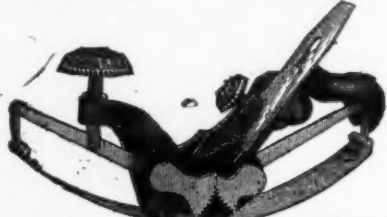
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maining for a length of time in the casting  
ladle. Prof. Ledebur advances the opinion  
that the phenomenon is due to the presence  
of sulphide of silicon, which causes the blow-  
holes. He believes that by contact with the  
moist walls of the mold sulphurated hydro-  
gen is generated, which escapes, and that  
silica is formed in a fine state of division,  
the latter being carried off by the escaping  
gases. Under the action of cooling in the  
ladle, silicide of iron and a sulphide are  
formed.

## ANALYSES OF GROSSALMERODE FIRE-CLAY.

As the fire-clay of Grossalmerode, Ger-  
many, is one of the most refractory sub-  
stances known, the following recent analysis  
will prove interesting. It was made by  
Bischof, who is one of the best informed  
chemists in this branch of investigation:

|                                 |        |
|---------------------------------|--------|
| Alumina.....                    | 34.52  |
| Silica chemically combined..... | 43.38  |
| Silica mechanically mixed.....  | 6.53   |
| Magnesia.....                   | 0.73   |
| Lime.....                       | 0.76   |
| Oxide of iron.....              | 1.66   |
| Potassa.....                    | 1.51   |
| Sulphur.....                    | 0.26   |
| Loss by ignition.....           | 11.04  |
| Total.....                      | 100.39 |

The slag was dried at 120 degrees. When  
exposed to platinum melting point it retained  
its shape, and the surface did not become  
glazed. Shrinkage in consequences of ex-  
posure to a red heat amounted to 11.5 per  
cent.

## THE BERRENS QUICKSILVER FURNACE.

In a former issue of *The Iron Age* we  
called attention to the experiments made at  
Almadén, Spain, with the old Bustamante,  
the Idria and the Pellet quicksilver furnaces,  
stating how unexpectedly superior the work  
of the Bustamante system, now 232 years  
old, was found to be. Recently an apparatus  
constructed by Hippolyte Berrens has been  
submitted to practical test at Barcelona,  
Spain, by a commission of Spanish govern-  
ment engineers, and the results obtained  
were certainly such as to deserve the atten-  
tion of American metallurgists. We take  
from the *Correspondance Scientifique* the  
following description of the apparatus: It  
consists of a horizontal or vertical furnace,  
charged periodically, as its action is not con-  
tinuous. It connects with a transmission  
chamber, from which the gases pass into con-  
densers, 17 to 25 in number, the shape of  
which resembles that of two cones united at  
their base. The lower cone is buried in the  
ground, the upper, made of sheet iron, is  
cooled by a continuous stream of water.  
Each condenser has a capacity of about 30  
cubic feet. They communicate with one  
another at their lower parts. The last one  
of the system is connected with a chamber  
containing charcoal, destined to remove the  
last traces of mercury from the gases.  
There is no chimney, but an aspirator in-  
stead, which permits accurate regulation of  
the furnace. The walls of the apparatus  
are coated with a layer of a mixture of  
equal parts of charcoal powder and cement.  
The furnace at Barcelona was charged with  
15,717 pounds of 2.76 per cent. ore. Theo-  
retically, therefore, the yield should have  
been 455.39 pounds of quicksilver, but in  
fact it was 450.96, which proves a loss of  
0.79 per cent., although the carbon of the  
last receiver was not examined. Gold leaf  
placed at the end of the apparatus did not  
show the least trace of amalgam. A second  
trial was made to test the efficiency of the  
apparatus under the most trying circum-  
stances, and it is but just to state that both  
the experiments were made in summer, at a  
time when work at Almadén is entirely sus-  
pended on account of the too heavy loss of  
quicksilver. In this second trial the ex-  
hauster was run at so high a speed that the  
ore in the furnace was glazed; the time of  
the operation was decreased by 25 hours, and  
yet the yield from a charge of 15,790 pounds  
of 2.82 per cent. ore was 434.51 pounds, the  
loss amounting to 3.62 per cent. A hori-  
zontal furnace is now building at Fondu-  
guilla capable of working 20 to 30 tons of  
1 per cent. ore per day.

## CARVES' COOKING SYSTEM.

A correspondent of *Engineering* states  
that Carves' cooking system has been adopted  
at Bessèges by the Terrenoire Company.  
The oven is of the ordinary Belgian pattern,  
with bottom and side flues, which are heated  
by the gas given off in coking. This, how-  
ever, is not burnt direct, the volatile pro-  
ducts of the distillation being first drawn by  
an extractor through a system of serpentine  
pipes and condensers analogous to those  
used in gas purification, when the tar and  
ammoniacal water are condensed, after  
which the purified gas passes over a grate  
fire at the bottom of the oven and is burnt  
for heating, the waste flame raising steam  
for the ram and other operations requiring  
power. The original ovens were about 32  
inches wide, but on rebuilding a series that  
has been several years in use, they have  
been reduced to 29 1/2 inches and 28 1/2 inches  
in order to get the interior of the coke more  
thoroughly carbonized. The time of burn-  
ing is about 72 hours; 1573 parts of coal  
yield 1000 of coke, the accessory products  
being 24.52 of tar and ammonia water, equal  
to 3.6 of sulphate of ammonia, about a ton  
of that salt being produced daily.

## Panic in the Scotch Iron Trade.

GLASGOW, October 15.—There is a panic  
in the iron trade here, in consequence of a  
reported heavy failure and rumors of other  
suspensions. The prices of pig iron were at  
one time 10 pence per ton lower on the day.  
Later.—Wotherspoon, the well-known iron  
founder, has failed, with liabilities amount-  
ing to \$500,000.

Mr. C. E. Manby, an English analytical  
chemist, reports that he has discovered a  
new mineral in the mineral clay of Furness.  
From a paper on the subject read before the  
Barrow Naturalist Field Club, he says he  
names the new mineral vermicellite, owing  
to its similarity in many respects to the  
vermicellite of Pennsylvania, belonging to  
the mica group. The distinction between  
the two metals appears to be a great increase  
of ferric oxide in vermicellite, a decrease of  
alumina, silica and water, with the addition  
of new compounds, titanio and phosphoric  
acids, lime and soda.

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**Thirty-second Page.**—Philadelphia, Buffalo, Chicago and Pittsburgh Hardware and Metal Prices.  
**Thirty-seventh Page.**—Boston and St. Louis Hardware and Metal Prices.

It is rumored that Fernando Wood is preparing to bring in his tariff bill again next winter. An ordinary mortal would have been satisfied with one such snub as Mr. Wood received last winter, but he seems laboring under the impression that he knows what the people of this country want a great

deal better than they know it themselves. This design—if it be true that he cherishes it—will explain the pathetic farce Mr. Wood has been enacting at the New York custom house, in which he has met, called himself to order as a committee, examined and cross-examined the witnesses, and adjourned himself with complete harmony and unanimity. Mr. Wood, if he is not blind, will soon see that never before in the history of this country was the tariff sentiment so strong as it is to-day. Labor has never been so powerful in politics, and labor is almost a unit for protection. The working classes know that with our great natural resources our only need of protection is that labor may be better paid and better fed, and while labor remains a power it will demand that protection be continued. It served a notice to that effect on Mr. Wood last winter, and will do it more decidedly this winter if he again attempts to force upon the attention of Congress what our French exchanges would call a *bill sur le bois*.

### Condition of the Blast Furnaces of the United States Oct. 1st, 1878.

We print in another column our regular quarterly report of the condition of the blast furnaces of the United States, and in doing so express once more the great obligations we are under to our numerous correspondents in all parts of the country. In order to avoid any misunderstanding and to point out exactly the scope of the table, the following explanations are given:

1. The divisions of localities are geographical for the most part, and are not made with reference to the points from which furnace supplies are drawn. 2. The columns "in blast" and "out of blast" only show the stacks from which we have reports, and their footings will not equal the footings of the column of total number. 3. We have included some furnaces that are rebuilding and not yet completed and others that are building, and in one or two cases some furnaces that have been reported abandoned, since their owners do not report them. In other cases we have stricken from our list furnaces that are generally included in such lists, as we are assured that they are permanently out. 4. The column of capacity per week is much in excess of what the regular working of the furnace will show—stoppages, slow working and various other causes which will readily occur to those interested, combining to reduce the make below the furnace capacity.

Since our last report, Mr. Jas. M. Swank has laid the iron trade of this country under renewed obligations for a new edition of his directory of the iron and steel works of the United States. As our totals differ in several districts from those given by him, we feel that some explanation of the discrepancies is due our readers. The difference may be in some part accounted for as follows: 1. We have not as yet included in our list furnaces built for making spiegel. 2. As we state above, we have included furnaces that are building or rebuilding and not yet completed, while Mr. Swank's report is of completed furnaces only. 3. By a hasty comparison of our reports with the directory, we find that some furnaces which are reported to us as abandoned are not so classed in the directory, and on the other hand, furnaces are not reported to us as abandoned which are so reported in the directory. To find out whether furnaces have been abandoned or not has been the most difficult part of our work. One quarter a furnace will be reported abandoned; the next quarter the same correspondent, one of the owners perhaps, will conclude that he will repair and blow in. We do not doubt that in a closer and more careful comparison of our reports with those of Mr. Swank, we shall be led to regard as abandoned some of those we have in our list. As it is, we have concluded to report on our usual basis.

The condition of the furnaces at the date of our report and at a corresponding date last year, is shown in a consolidated form in the following table:

|                      | In Blast.<br>Oct. 1, 1878. | Oct. 1, 1877. | Out of Blast.<br>Oct. 1, 1878. | Oct. 1, 1877. |
|----------------------|----------------------------|---------------|--------------------------------|---------------|
| Charcoal . . . . .   | 83                         | 89            | 186                            | 176           |
| Anthracite . . . . . | 88                         | 88            | 135                            | 140           |
| Bituminous . . . . . | 80                         | 77            | 133                            | 136           |
| Total . . . . .      | 251                        | 254           | 454                            | 452           |

From this report it will be seen that there is but little difference in the condition of the furnaces of the country at the two dates. An inspection of the tables in detail, however, will show that among charcoal furnaces there has been an increase in the number in blast in New England, New York, Pennsylvania, the Hanging Rock region, Kentucky and Wisconsin, while the others have held their own or decreased, making on the whole an increase in the East and decrease in the West. In anthracite there has been an increase in New York and the Upper Susquehanna Valley. There has been a large decrease in the coke furnaces in blast in the Shenandoah and Mahoning Valleys, and no decided changes in the other sections.

Taking the quarters of the year 1878 we have the following:

|                      | In Blast.<br>Jan. 1, April 1, July 1, Oct. 1.     |
|----------------------|---|
| Charcoal . . . . .   | 79 60 54 83                                       |
| Anthracite . . . . . | 95 97 93 88                                       |
| Bituminous . . . . . | 86 95 82 80                                       |
| Total . . . . .      | 260 252 229 251                                   |
|                      | Out of Blast.<br>Jan. 1, April 1, July 1, Oct. 1. |
| Charcoal . . . . .   | 180 207 202 186                                   |
| Anthracite . . . . . | 118 120 130 133                                   |
| Bituminous . . . . . | 139 122 128 133                                   |
| Total . . . . .      | 437 449 460 452                                   |

To show the changes since 1874, we ap-

pend a table giving the percentage of furnaces in blast and out of blast at nearly corresponding dates for four years past. The figures for 1874-1876 are for Sept. 1; for 1877-1878, Oct. 1.

### PERCENTAGE OF FURNACES IN AND OUT OF BLAST AT OR NEAR OCT. 1.

|                      | 1874. | 1875. | 1876. | 1877. | 1878. |
|----------------------|-------|-------|-------|-------|-------|
| In Blast.            |       |       |       |       |       |
| Charcoal . . . . .   | 69%   | 40%   | 39%   | 34%   | 31%   |
| Anthracite . . . . . | 61%   | 42%   | 31%   | 38%   | 39%   |
| Bituminous . . . . . | 46%   | 45%   | 26%   | 36%   | 38%   |

|                      | 1874. | 1875. | 1876. | 1877. | 1878. |
|----------------------|-------|-------|-------|-------|-------|
| Out of Blast.        |       |       |       |       |       |
| Charcoal . . . . .   | 31%   | 60%   | 60%   | 66%   | 69%   |
| Anthracite . . . . . | 39%   | 58%   | 69%   | 62%   | 61%   |
| Bituminous . . . . . | 54%   | 55%   | 74%   | 64%   | 62%   |

In regard to the outlook it may be said that there is certainly an increased demand for pig iron all over the country, and in most cases it commands a better price, or at least the price is firmer. Buyers are seeking iron, a condition of the market that has not existed for some time. At the mills the stocks of pig iron have been reduced to the lowest point they have reached for years. Wrought scrap, whether as old rails or as common scrap, is scarcer and dearer, and the economy in using this in place of pig iron is very small. Three months ago old rails were quoted in Philadelphia at \$19 @ \$19.50. Last week they were \$19.50 @ \$20 for average lots, and higher prices for extra qualities. While this is the condition of the country at large, there does not seem to be as good a feeling East as West. A correspondent who is in a position to speak authoritatively writes from Eastern Pennsylvania: "Prices for pig and manufactured iron still rule very low. There is considerable inquiry, but few offers of cash, and the long and dubious credits that are tendered prevent many a sale. The iron men in this vicinity are far from happy."

In the West, however, there is an unwonted activity. As we have before noted, prices for red-hot pig iron have advanced considerably in the past six weeks, and furnaces are blowing in to make this grade and Bessemer. There is at some points an increased demand for charcoal irons suitable for the Bessemer process. The use of this material had been well-nigh abandoned, but some of the mills are beginning to use it again. We also hear of a Western coke furnace just blown in which has sold 1500 tons of all-ore red-hot pig at an advance of 50c. Some of the furnaces at St. Louis that were out so long have resumed or will soon do so. The Big Muddy, that has been out for years, was to have gone in again. The Milwaukee furnaces are both blowing. There are also several new furnaces to be erected at once in or near Pittsburgh. The Edgar Thomson Steel Works' people have decided to build one or two stacks immediately, the number depending on the size adopted, while the Cambria are to put up another stack at once. Altogether the outlook in the West for furnaces of modern construction and well situated is encouraging.

### Industrial Schools.

Correspondents tell us that the Paris Exhibition has reaffirmed the superiority of French products of industry in grace and beauty of outline and taste in the choice of color and design. An examination of the causes of this superiority in the industrial applications of art shows that it is largely attributable to the so-called industrial schools of France. It is claimed for these schools that they have materially aided in accomplishing two great ends—the partial abolishment of apprenticeship and the development of artistic taste. It is pointed out that apprentices in industrial establishments as now organized no longer obtain a general proficiency in their trade, but are trained to acquire great skill in one branch of their specialty, beyond which they are incompetent, and therefore helpless in case of need. Again, that the jealousy of modern trade organizations has gone so far as to arbitrarily limit the number of apprentices with the object of preventing competition, thus presenting serious obstacles to industrial progress. A remedy for the evils thereby entailed has been found in France in the establishment of industrial schools. The possibility of training apprentices in schools and the degree in which a school may replace the shop, must depend upon the nature of the trade to be learned. The great variety of the demands made upon purely preparatory studies, not to speak of the diversity of the practical training called for, would make a general industrial school one which would accomplish good only when organized on a very extensive scale. There are such schools in France, but the greater number are devoted to specialties only. Thus Lyons has one for weavers, Nevers one for ironworkers, Limoges one for china makers. These schools are not alone patronized by youths and women, but by men long out of their apprenticeship, especially the evening schools.

The second purpose to be gained by industrial schools is the development and training of artistic taste. This has been universally recognized, and has received a good deal of attention both in this country and abroad. It is more easily carried out practically, because the lessons may be limited to the evening hours, leaving the young student free to support himself by work during the day. Schools for drawing, both mechanical and freehand, have existed for many years and have done much toward effecting their object. Much yet remains to be done in this direction here, but the fact that we have made a beginning is encouraging.

The success of these art schools is beyond question. They have a firm hold upon the sympathies of the public, and will, we feel sure, continue to deserve and obtain a generous support. The industrial schools, on the other hand, are less likely to become popular in this country, although the fact that the French schools are the outgrowth of the generosity of private citizens, who encourage them by the presentation of medals, &c., gives ground for the hope that public-spirited citizens of the United States will soon recognize their importance. An industrial school designed to teach a trade to young men or women must not only furnish them free tuition, but in some way contribute to the support of its pupils. This places their establishment almost beyond the power of individual generosity, and it is only by the enterprise of trade associations that anything of true value can be accomplished. The great interests at stake and the growing difficulties of thorough technical training, certainly call for an earnest search for means to remedy evils which must soon be checked, and it is one of the preparatory steps to such efforts to examine carefully, with a due consideration of the difference of conditions, all that has been attempted or achieved elsewhere.

### The Suits Against the Pennsylvania Railroad et al. for Discrimination.

Suits of more than ordinary importance in their bearings upon the question of freight discriminations have been begun in the Supreme Court of Pennsylvania at Pittsburgh. The Deputy Attorney General of the State has filed bills in equity against the Pennsylvania Railroad Company, the United Pipe Line and several other carrying corporations, alleging an unlawful combination to control the business of producing, dealing in and transporting petroleum, and asking an injunction against them to restrain them from further refusing to receive and carry oil on the same terms for one party as for another.

The bill against the Pennsylvania Railroad Company sets forth with the customary legal verbiage that they have entered into an unlawful combination with the United Pipe Line, a corporation owned in part and entirely controlled by a corporation known as the Standard Oil Company; that the combination has for its object the control of the entire business of producing, buying, selling, transporting and storing crude petroleum in certain counties named, and also to the seaboard and markets of the United States and the world, and likewise the manufacture and sale of the refined product, and in carrying out such purpose the said Pennsylvania Railroad Company have been and are now a chief instrument; that in order to attain the objects aforesaid the said railroad company have been guilty of many unlawful and oppressive acts, violating their charter privileges, and thereby inflicting irreparable injury on the Commonwealth, its citizens and those engaged in lawful commerce; that they have refused to furnish cars and motive power for merchants and manufacturers who demand them for transportation of their freights, and have refused to allow such merchants and manufacturers to furnish their own cars upon any terms; that they have refused to receive or carry petroleum when tendered to them, accompanied by an offer to pay the usual rate for transportation; that they have combined by these means, and other unlawful and oppressive acts, to depress the price of petroleum so that the managers of the Standard Oil Company could buy the same at less than market value, and enrich themselves at the expense of the prosperity of the community in which they do business and the ruin of individuals; that they have refused to transport petroleum from convenient shipping points upon the lines of railroads owned or controlled by them, and to deliver the same in cars, and have combined with other railroads, by unlawful and corrupt practices, to induce the managers thereof to refuse to receive or carry petroleum; that they have threatened said railroad corporations to withdraw all petroleum and other carrying business from their lines, and have refused to load cars unless such railroad corporations would ship in the direction and to the persons by said combination designated, and have ordered the said railroad corporations to sever connections and refuse cars to those who were about to ship petroleum over their lines, and that they have combined with the said corporations for the purposes of depressing prices, enabling others to buy at low figures the crude petroleum of which the Standard Oil Company are manufacturers, acquiring and keeping control of the business of buying, selling, transporting, manufacturing and storing the same, and enabling the said Standard Oil Company to pay, by means of rebates, drawbacks, commissions and other devices, a lower rate of freight than that charged to the public, whom they compelled to pay a sum unreasonably high.

The bill then goes on to recite numerous illegal and oppressive acts on the part of the railroad company, and prays that they be enjoined from refusing to receive crude petroleum from any petroleum wells, pipe lines or tanks reached by their cars; from refusing to transport petroleum offered to them in the course of business; from refusing to receive and transport petroleum unless the same is sold, or agreed to be sold, to some person or persons or corporation; from making any discrimination in

charges for freight or facilities for transportation of petroleum between individuals, firms or corporations for the same or substantially the same distance; from making any discrimination in the rates of freight or facilities for transportation in favor of any person, firm or corporation shipping or offering to ship a large quantity against any person, firm or corporation offering to ship or shipping a smaller quantity; from giving to their own officers, agents, dealers or employees greater facilities or means of transportation, or lower rates than to the public; from combining or agreeing with any other corporation, firm, person or persons to buy crude petroleum at less than the market value, or to depress the price thereof; from combining or agreeing with any other person or persons, firm, corporation or association to receive or give or procure, by any device, drawbacks, rebates and commissions on freights; from interfering, directly or indirectly, with the carrying business of the several railroad corporations whose lines are reached by their cars; from engaging in any commercial business relating to petroleum, and from buying and selling the same directly or indirectly; from permitting to overflow the tanks at the wells, connected by pipe lines with their railroad, by refusing to receive and transport petroleum in their cars; from exceeding their corporate functions and oppressing individuals in the manner in the foregoing bill alleged.

Similar bills were also filed against the Dunkirk, Allegheny Valley and the Pittsburgh Railroad Companies, the Lake Shore and Michigan Southern Railroad Company and the Atlantic and Great Western Railroad Company. The bill against the United Pipe Line charges unlawful combinations similar to those charged against the Pennsylvania and other railroad companies, in violation of its charter privileges, and prays for an injunction.

That this movement is regarded as of serious importance to the Pennsylvania Railroad is shown by the fact that the president, Colonel Scott, has telegraphed all over the country a long denial of the charges, shrewdly worded, addressed to the stockholders of the company. That there has been a combination between the Pennsylvania, Erie, Lake Shore, and Baltimore and Ohio with the Standard Oil Company, having for its object the control of the production, sale and transportation of petroleum, no one conversant with the facts would venture to deny; and that these railroads have pooled the business of carrying oil and divided the proceeds of the same; that they have directly or indirectly refused to transport oil for producers and consumers not under the protection of the Standard Oil Company, and that where they have carried oil for such parties it has been at a much higher rate than the Standard Oil Company has paid, are well known facts. Even Col. Scott does not deny discriminations. He says: "I desire to state that the Pennsylvania Railroad Company is in no possible 'combination in regard to producing, buying, selling, or otherwise dealing in oil,' but when it comes to the question of transportation he hedges and says, 'and that it does not believe it has made any unlawful discrimination at any time or under any circumstances, and upon the hearing of the case, if it ever comes to a hearing, it will make this very plain to any court before whom it may be heard.'"

The question raised in the suit against the Pennsylvania Railroad and other corporations named is one of material interest. Transportation is the one uncertain but controlling factor in the problem of the industrial and commercial future of the United States. Our country is so great, territorially, that without cheap transportation we shall be heavily handicapped in our competition with other countries of less geographical area. If it is in the power of the common carriers to form and maintain combinations by which they seek objects prejudicial to the public interest, they will be able to place serious, if not insurmountable, obstacles in the way of our national development and the extension of our foreign trade. Naturally, the railroads will seek every advantage which their great capital and powerful influence place within their reach; but the public good must be protected, and whatever is contrary to this must yield to the power of the law. We are now in a fair way to see whether the law is able to cope with a gigantic monopoly like the Standard Oil Company and its allies—the railroads and the pipe lines. We sincerely hope that this suit will be pushed to an issue, and that if the charges of unjust discrimination are established we shall learn from the results how such combinations may be met and defeated in future.

It appears that the conductor of the freight train which was indirectly the means of wrecking the excursion train at Wollaston, Mass., is to be tried for manslaughter. This is right enough, for all that we know to the contrary; but however great the measure of this unfortunate man's responsibility may be, that of the officers of the road is greater. The fearful mortality attending the accident is due almost wholly to the fact that the train was composed of cars of a pattern known to be weak and unable to resist the shocks which experience has shown must be provided against in car construction. With proper care the accident would in all probability have been attended with no worse consequences than a few bruises and some broken glass. With



such cars as composed the wrecked excursion train the lives of passengers are not safe risks for the accident insurance companies. One good engine would telescope half a dozen of them, and probably suffer no further damage than the loss of its headlight and some brasswork. Perhaps if Attorney-General Train will look a little closer into the facts he will see that Hartwell, the freight conductor, is not the only person connected with the road for whom an order of arrest might be issued with propriety.

## The Proposed Canadian Tariff on Pig Iron.

If our Canadian friends start off, as is now reported to be their intention, with a duty of \$7 per ton on pig iron, their action will settle the question of whether any considerable number of our manufacturers go there to establish branches in the hardware, agricultural implement and machinery lines. There will be more money in manufacturing here and paying duty on the finished products sent to the Canadian markets. It may be wise for them to protect their industries, but the pig iron industry of Canada, if not unborn, is still insignificant, and its development is of vastly less importance to them than that of many branches of manufacture which will be handicapped by so high a duty on a raw material indispensably necessary, and which cannot for some time to come be obtained in Canada. What was good policy for us, having an iron industry to protect, will not necessarily be good policy for Canada, with an iron industry yet to be created. How they adjust their duties is, of course, no affair of ours. So far as our people are concerned, they have a perfect right to make it \$100 per ton on pig iron if they want to; but they would do well to remember, in imitating the policy of the United States, that like causes produce like results only under like circumstances. When our tariff was adopted it was a financial necessity. Our government needed the revenue, and those who could think beyond to-morrow saw that it must remain in force for many years. Capital accordingly took courage and sought investments in iron-making with a reasonable certainty of continued protection. In Canada the policy of protection is an experiment. It may not last beyond the next general election, and capitalists are not likely to build furnaces and develop mines unless they see in such investments the promise of something more than immediate and temporary profit. Tremendous influences will be brought to bear to effect the repeal of the tariff or its modification in every item in which it interferes with British interests. For the present it would look as if a raw material like pig iron might with advantage be taxed very lightly—at least until there is some prospect of a home supply proportionate to the consumption of the Canadian markets. But, as we said before, this is no affair of ours.

### The Increased Consumption of Iron by Railroads.

Some of the most encouraging features in the iron trade at the present moment are found in connection with the railroads of the country. The railroad interest was the first to feel the effect of the great panic of 1873. Renewals and repairs as well as new work at once ceased, because, unfortunately, upon railways, by "makeshifts" and temporary expedients, repairs and renewals can be postponed for a long time. Again, the credit of railroads has been so badly hurt by the defaults of the past few years that extensions have been well-nigh impossible except upon the certainty of a paying traffic. In this light the increased demand for iron in its various forms for railroad uses becomes very important. Its amount is considerable, but as an indication it is of great value. As is well known, all the Bessemer rail mills are busy, with the single exception of one not in operation, and are full of orders at prices which, if not entirely satisfactory, enable makers to run without loss. Iron rails are also in considerable demand for certain roads and parts of roads over which the traffic is not very heavy. Mills in some localities are eagerly buying, for rolling, all the old rails of fair quality that are offered. The demand for iron for railroad bridges is also very large. We announced last week that the Keystone Bridge Company had secured the contract for 5000 tons of bridges from the Cincinnati Southern road, and now we learn that they have contracted to build several bridges in New England. We also see from the *Bulletin* of the American Iron and Steel Association that Messrs. Clarke, Reeves & Co., of Phoenixville, have secured a contract for the construction of nine iron bridges for the Quebec, Montreal, Ottawa and Occidental Railway of Canada.

Those who have read from week to week our department of Industrial Items will have noticed the large number of freight cars that we have announced as in course of construction, amounting to thousands. All of these facts indicate a better condition of credits, and of course confidence, and everything warrants the belief that from this time on the railroads will be larger and more liberal consumers of iron than they have been during the past five years. The fact that they have been close and small buyers so long shows that they must be in a condition to need a good deal of new material.

At a preliminary meeting of the boiler plate manufacturers, held in accordance

with a suggestion of the Supervising Inspector General, it was resolved that a call be issued to all the manufacturers of boiler plate for a general meeting, to be held in Philadelphia on the 13th of November next, at the Continental Hotel, at 11 o'clock a. m., to give expression to their views regarding the execution of the requirements of the law concerning the homogeneity, toughness, &c., of boiler plates. The meeting called by this resolution is an important one, and we shall probably have something to say concerning it before the date named.

Elsewhere in this issue will be found matter of interest relating to the introduction in the Brazilian markets of foreign imitations of American manufactures. Unfortunately such a competition hurts us worse in Brazil and other South American markets than it does in Europe or where the people have a higher civilization and better defined wants. A correspondent writing from there under recent date, says: "They are not an experimental people, and they are not possessed of that judicial cast of mind which leads the German and the Anglo-Saxon to examine, test and weigh a matter before coming to a final determination. With a Maine lumberman the purchase of an ax involves no small amount of keen examination and calculation—a mental effort of great delicacy and care; so, too, with the Massachusetts housewife in her purchase of a dress or a piece of muslin. In this country, however, beyond the haggling over the price, there is no such feature known. The nearest approach to it is the Brazilian objection to an American hoe or cook-stove because it is not heavy enough for the blacks—an objection which depends upon the appearance of the article rather than upon a knowledge of its strength." Such a people are as likely to take an imitation as a genuine article, but it is to be hoped that measures now on foot will lead to the enactment of Brazilian laws under which our manufacturers can register their trade-marks and so protect themselves against this most annoying kind of competition.

An "esteemed contemporary" which gives some attention to iron matters, and which we refrain from naming from considerations of professional courtesy, predicts good times for the blast furnaces on what we fear is a mistaken assumption. We quote as follows: "There is a decided improvement in the tone of the papers regarding mill irons. They all report to the effect that holders are firm and refuse to sell unless at an advance in current rates. The advance in the prices of finished iron show a demand for it, and you can't produce bar iron unless from pig iron. Merchants must have iron in all branches and kinds to sell to their customers, and mill men are forced to buy pig iron in order to make the bar, so we don't see any logical reason why pig iron will not soon feel the upward movement and verify the prophecies which we have made from time to time in this column." If it were only true that the rolling mills could produce bar iron from nothing save pig, what good times we should have and how happy everybody in the iron business would be. Alas! it isn't. The omnipresent old rail and the all-pervading wrought scrap are very good, and, it must be admitted, quite logical reasons why our contemporary's oft-repeated and confident prophecy is not likely to be vindicated by the happenings of the immediate future.

The verdict of the Coroner's jury impaneled at South Norwalk, Conn., to determine the cause of death in the case of the victims of the Adelphi disaster, is an interesting document. We print it in another column. It condemns everything, from the engineer and the boiler up to Mr. Inspector Blake, whose "shiftless inspection" made the accident possible, and it also condemns the law under which he acted. It is unnecessary to say more than that we perfectly agree with this verdict in its wholesale condemnations, but its recommendations are open to discussion. The best way to reform the present law of steamboat inspection is to repeal it.

### New Publications.

REPORTS AND AWARDS OF THE UNITED STATES CENTENNIAL COMMISSION. Edited by Francis A. Walker. Published by J. B. Lippincott & Co., Philadelphia, Pa.

The complete set of reports and awards of the Centennial Commission is now before the public, and we are happy to say they are very satisfactory. Aside from their great value to business men as an official record of the verdict of the respective juries, they possess high merit because they embody monographs on the status of great industries at the close of the first century of our national life, written by men chosen for their special familiarity with the several branches of manufacture treated. Some of the reports—and we are happy to add, those especially of trades in which the readers of *The Iron Age* are more directly interested—are remarkable for their accuracy of judgment and the wide range of thought and knowledge they embody. As such they possess more than a transient interest, and all who extend their technical knowledge beyond more than a complete familiarity with a specialty, should add them to their libraries. In some cases the reports are rather summaries of what has been achieved in the fields of industry under review than a simple discussion of the objects presented to criticism at the Exhibition.

## Condition of the Blast Furnaces of the United States, October 1, 1878.

(Compiled for *The Iron Age*).

| Location.                             | CHARCOAL.               |                           |                    |                               |                    | ANTHRACITE.             |                           |                    |                               |                    | BITUMINOUS OR COKE.     |                           |                    |                               |                    |
|---------------------------------------|-------------------------|---------------------------|--------------------|-------------------------------|--------------------|-------------------------|---------------------------|--------------------|-------------------------------|--------------------|-------------------------|---------------------------|--------------------|-------------------------------|--------------------|
|                                       | Total number of stacks. | Number reported in blast. | Capacity per week. | Number reported out of blast. | Capacity per week. | Total number of stacks. | Number reported in blast. | Capacity per week. | Number reported out of blast. | Capacity per week. | Total number of stacks. | Number reported in blast. | Capacity per week. | Number reported out of blast. | Capacity per week. |
| New England.....                      | 18                      | 7                         | 490                | 11                            | 696                | 1                       |                           |                    | 1                             | 180                |                         |                           |                    |                               |                    |
| New York.....                         | 17                      | 5                         | 280                | 12                            | 984                | 42                      | 20                        | 4,460              | 22                            | 4,695              |                         |                           |                    |                               |                    |
| New Jersey.....                       |                         |                           |                    |                               |                    | 16                      | 5                         | 1,170              | 11                            | 2,550              |                         |                           |                    |                               |                    |
| Pennsylvania.....                     | 37                      | 20                        | 834                | 17                            | 416                |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Lehigh Valley.....                    |                         |                           |                    |                               |                    | 50                      | 28                        | 6,000              | 22                            | 4,850              |                         |                           |                    |                               |                    |
| Schuylkill Valley.....                |                         |                           |                    |                               |                    | 49                      | 12                        | 2,205              | 37                            | 6,120              |                         |                           |                    |                               |                    |
| Upper Susquehanna Valley.....         |                         |                           |                    |                               |                    | 24                      | 7                         | 1,050              | 17                            | 2,830              |                         |                           |                    |                               |                    |
| Lower Susquehanna Valley.....         |                         |                           |                    |                               |                    | 37                      | 15                        | 2,565              | 22                            | 2,695              |                         |                           |                    |                               |                    |
| Pittsburgh.....                       |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 12                      | 7                         | 4,080              | 5                             | 1,455              |
| Allegheny Valley.....                 |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 10                      | 2                         | 255                | 8                             | 775                |
| Shenango Valley.....                  |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 31                      | 5                         | 1,005              | 26                            | 5,400              |
| Yough'eny Valley.....                 |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 5                       | 3                         | 1,125              | 2                             | 250                |
| Juniata and Conemaugh Valley.....     |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 20                      | 13                        | 1,225              | 7                             | 955                |
| Maryland.....                         | 17                      | 4                         | 230                | 13                            | 625                | 3                       | 1                         | 150                | 2                             | 300                | 4                       |                           |                    | 4                             | 455                |
| Virginia.....                         | 27                      | 3                         | 110                | 24                            | 998                | 1                       | 0                         |                    | 1                             | 140                | 5                       | 2                         | 230                | 3                             | 250                |
| North Carolina.....                   | 7                       |                           |                    | 7                             | 274                |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| West Virginia.....                    | 6                       | 1                         | 42                 | 5                             | 471                |                         |                           |                    |                               |                    | 6                       | 2                         | 625                | 4                             | 1,195              |
| Ohio.....                             |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Mahoning Valley.....                  |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 19                      | 7                         | 1,875              | 12                            | 2,760              |
| Eastern, Central and Northern.....    |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 21                      | 9                         | 2,180              | 12                            | 3,185              |
| Hocking Valley.....                   |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 13                      | 9                         | 1,200              | 4                             | 590                |
| Hanging Rock.....                     |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 16                      | 5                         | 810                | 11                            | 1,865              |
| Miscellaneous.....                    | 32                      | 15                        | 1,230              | 17                            | 1,370              |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Kentucky.....                         | 3                       |                           |                    | 3                             | 235                |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Hanging Rock.....                     | 7                       | 5                         | 450                | 2                             | 140                |                         |                           |                    |                               |                    | 3                       | 3                         | 1,050              |                               |                    |
| Western region and Miscellaneous..... | 8                       |                           |                    | 8                             | 566                |                         |                           |                    |                               |                    | 1                       | 1                         | 300                |                               |                    |
| Tennessee.....                        | 17                      | 3                         | 208                | 14                            | 1,010              |                         |                           |                    |                               |                    | 7                       | 2                         | 355                | 5                             | 2,080              |
| Georgia.....                          | 6                       | 1                         | 150                | 5                             | 225                |                         |                           |                    |                               |                    | 3                       | 1                         | 225                | 2                             | 170                |
| Alabama.....                          | 11                      | 4                         | 625                | 7                             | 615                |                         |                           |                    |                               |                    | 2                       | 1                         | 175                | 1                             | 175                |
| Indiana.....                          | 1                       |                           |                    | 1                             | 140                |                         |                           |                    |                               |                    |                         |                           |                    | 8                             | 1,360              |
| Illinois.....                         |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 8                       |                           |                    |                               | 2,990              |
| Michigan.....                         |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    | 12                      | 4                         | 1,250              |                               |                    |
| Wisconsin.....                        | 31                      | 8                         | 1,260              | 23                            | 2,975              |                         |                           |                    |                               |                    | 4                       |                           |                    | 4                             | 1,050              |
| Minnesota.....                        | 12                      | 4                         | 575                | 8                             | 930                |                         |                           |                    |                               |                    | 3                       | 2                         | 700                | 1                             | 300                |
| Missouri.....                         | 1                       |                           |                    | 1                             |                    |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Texas.....                            | 11                      | 3                         | 595                | 8                             | 1,120              |                         |                           |                    |                               |                    | 8                       | 2                         | 700                | 6                             | 2,200              |
| Utah.....                             | 1                       |                           |                    |                               |                    |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Oregon.....                           | 1                       |                           |                    |                               |                    |                         |                           |                    |                               |                    |                         |                           |                    |                               |                    |
| Total.....                            | 272                     | 83                        | 7,079              | 186                           | 13,790             | 223                     | 88                        | 17,660             | 135                           | 24,360             | 213                     | 80                        | 19,360             | 133                           | 29,360             |

The most valuable report to the readers of *The Iron Age* is that of Group I, on minerals, mining and metallurgy. It contains a report on bitumen, petroleum, &c., by G. C. Broadhead, who sketches the early history of petroleum, its geology and statistics, and briefly describes its occurrence in various localities. Wrought Iron and Steel by Alex. L. Holley, is a brilliant essay, his pages on the state of the art giving the most concise and well-balanced summary of the present status and the prospective advance in iron metallurgy to be found in English literature. Prof. Frederick Prime, Jr., who has strictly adhered to what the Exhibition offered, has naturally labored under a heavy disadvantage in discussing the wealth of coal in the different sections of this country and in other countries. His report, however, embodies much that will be found of service to those who seek to gain information on the nature of coals hitherto little known, and the purpose to which fuels from some comparatively new districts may be applied. In general the enterprise of the districts which are struggling for recognition caused them to make strong efforts to show their resources, while the old and prosperous districts made no such efforts. Prof. Prime's report contains a large number of analyses and the results of the work of the different geological State surveys in regard to the tracing of the beds of each region. Prof. J. S. Newberry describes in a critical way the merits of the large display of ornamental and building stones, while the specialties of whetstones, oilstones, millstones, emery and corundum are discussed intelligently by J. M. Stafford. Daniel de Cortazar of Madrid, Spain, contributes a monograph on mercury and the modes of working its ores, which proves his thorough knowledge of European methods, while his estimation of the American metallurgy of quicksilver is rather incomplete.

The most exhaustive and timely official work published in connection with the exhibition seems to us to be Mr. E. F. Althaus' *Mechanical Dressing of Ores and Coal*, which opens the eyes of English readers for the first time to the inexhaustible treasures of Continental theoretical and practical research in this field. Compared with the French and German, English literature on mineral dressing is surprisingly poor, and as its importance has been rapidly and steadily growing in its application to the working of lead, copper and silver ores and the improvement of coal, Mr. Althaus' work deserves the careful perusal of engineers. Coal cutting machinery at the Exhibition, by Achille Jottrand of Belgium, in its brevity faithfully reflects the paucity of the Exhibition in the application of machinery to the getting of coal. The geological and mineralogical collections are described by James M. Safford, G. C. Broadhead, John H. Harden and C. E. Hall. Taken as a whole, the volume of reports from Group I is a highly creditable and valuable one, and as such will be prized by all interested in the subjects of which it treats, and we can only express regret that other industries which come within its sphere have not found as full a representation.

Group I includes pottery, porcelains, bricks, clays, cements, glass, &c., and the machinery used. The reports embody an able paper on the chemistry and composition of the porcelains and porcelain rocks of Japan by Prof. Henry Wurtz, in which he proves by chemical and microscopical analyses that the material used for Japanese pottery is not true kaoline, but petrosillex, and that no kaoline enters into its manufacture. Gen. Q. A. Gilmore, U. S. A., has two long and elaborate reports on Portland, Roman and other cements and artificial stone, and on brick making machinery, brick kilns, perforated and enameled bricks and pavements. The first one of the two is de-

scriptive of materials exhibited, with much valuable information concerning them. The second, fully illustrated, presents in a condensed form good descriptions of machinery which have been hitherto scattered in current periodical literature. Builders' hardware, edge tools, cutlery, &c., coming under Group XV, are gathered in a small volume, which, besides the report on awards, has a more detailed critical description of the main features of the numerous objects exhibited. Group XVI comprises sporting and military arms of all kinds and explosives. The report of the judges is admirable, and will commend itself as well to amateurs as to professional men for its brevity and the large amount of information it contains. The volume relating to Group XVIII, on railway plant, rolling stock and apparatus and road engines, is made up of an extract from the British Report on Railway Appliances, by Douglas Galton; a paper on Continuous Railway Brakes, and treatises on Chilled Cast Wheels for Railways, Elliptic Springs and Improvements in Branches of the Pennsylvania Railroad, by Felician Slataper, of Pittsburgh, Pa. These papers are rendered more valuable by numerous illustrations, among which the reproductions of photographs of specimens of Hamilton's steel-wheel process are particularly interesting.

Group XXII embraces all machines, &c., used in sewing and making cloth. As a preface to a detailed description of the various types of machines exhibited, the report gives a historical sketch by George W. Gregory, whose reports on the different machines are more elaborate than most of the notices published by the judges. Another paper discusses knitting machines. Mr. Edward H. Knight, of Washington, has treated on watch-making and needle-making machinery. Among the reports characterised by directness of statement and a thorough and accurate knowledge of detail is that of Group XXIII, on agricultural machines, implements of agriculture, horticulture and gardening. Astronomical and surveying instruments in Group XXV are reported on by J. E. Hilgard; optical instruments by F. A. P. Barnard; electrical apparatus by the late Joseph Henry, and musical instruments by Henry K. Oliver, who publishes interesting historical sketches also. Horological instruments in this group are described by James C. Watson, whose report is long and valuable.

Group XXVI comprises a small volume containing a short general review of the architectural exhibits by R. M. Hunt, two papers on the Netherlands and the French exhibits of public works and an extract from Sir John Hawkshaw's report to the British Commission. The reports of garden tools, ornamental ironwork for fences, gates, &c., may be found in the small volume of Group XXIX.

We regret our inability to enter more fully into a discussion of the other reports, which comprise the following: Group IV, animal and vegetable products; V, fish and fishing products; VI, timber, lumber, forestry, &c.; VII, furniture, upholstery; VIII, cotton, linen and other fabrics; IX, wool and silk fabrics; X, clothing, furs, &c.; XI, jewelry, watches, &c.; XII, leather and leather manufactures; XIII, paper, stationery, printing, &c.; XVII, carriages, &c.; XIX, vessels; XXI, machine tools; XXIV, surgical apparatus; XXVII, plastic and graphic art; XXVIII, education and science—a very valuable work of upward of 200 pages; XXX to XXXV, live stock; XXXVI, pomology.

The shape, printing, paper and illustrations reflect credit upon Messrs. Lippincott & Co., whose enterprise deserves a full measure of success. The price of the reports, which are sold singly, is remarkably low, ranging from 25¢ to \$1.50—the latter

figure for the larger volumes: for instance, that of Group I, which has upward of 500 pages. We have no hesitation in saying that the possessor of a set of these reports will consider himself fortunate a few years hence, as they are likely to become scarce and to acquire a permanent value as great as their present interest.

HISTORY OF THE METALLURGICAL TREATMENT OF MERCURY IN SPAIN. (Historia del Tratamiento Metalúrgico del Azogue en España) By D. Luis de la Escosura y Morrogh. Madrid, Spain.

A commission of three experts, including the author of the work before us, De Federico Botella and D. José Soler, was appointed in 1872 to make a comparative study of the two systems of working quicksilver cinnabar. Their object was to examine the working of the Bustamante and the Idria furnaces was to test a new apparatus proposed by Emile Pellet, a French engineer. The latter research was not carried to a close, but long and extensive trials were made in other directions; these, together with a full and detailed description of the apparatus and a highly interesting historical essay, constitute the body of the work, which is very well equipped with charts, lithographs and engravings. It is the most elaborate publication on the subject yet made, and contains much of interest. The greater part of the purely technical matter has been rendered more accessible to metallurgists, few of whom read Spanish, by the recent publication of an elaborate essay on Almadén, by M. Kuss, in the *Annales des Mines*. We have acquainted our readers with the more important features of this paper in a former issue of *The Iron Age*, and shall take an early occasion to give an abstract of Mr. de la Escosura's researches on the history of the metallurgical treatment of quicksilver in Spain. The author seems to have had free access to the archives of the government, so that, clothed with official powers, he has been able to give in his work a fullness of detail which hitherto no one has been able to attempt. We notice among other things some graphic records of the temperatures of condensers, a matter which has not received that careful attention in this country which it deserves. A daily record of outside temperatures, a barometric pressure, together with measurements of the heat of the condensers, might, we believe, lead to valuable results on the influence of the temperature of the air on the work of the furnaces. At Almadén this influence is so strong that the furnaces are worked only during a part of the year.

The work before us is admirably gotten up, the printing, paper and illustrations being equal to the best work of American publishers. It was published by the School of Mines as the essay which had received the prize provided for by a legacy made to the School by Don José Gómez Prado.

### Exhibition Awards to Americans.

PARIS, October 15.—It is now officially known that the awards to American exhibitors at the French Exposition number 750, namely: Ten grand prizes, 30 diplomas of honor, 134 gold medals, 200 silver medals, 220 bronze medals and 156 honorable mentions. The aggregate is larger than the whole number of American exhibitors at the Paris Exposition of 1867 or at the Vienna Exposition of 1873, and is a larger proportionate award to exhibitors than to any other nation represented at this exhibition.

### Export of Gold to America.

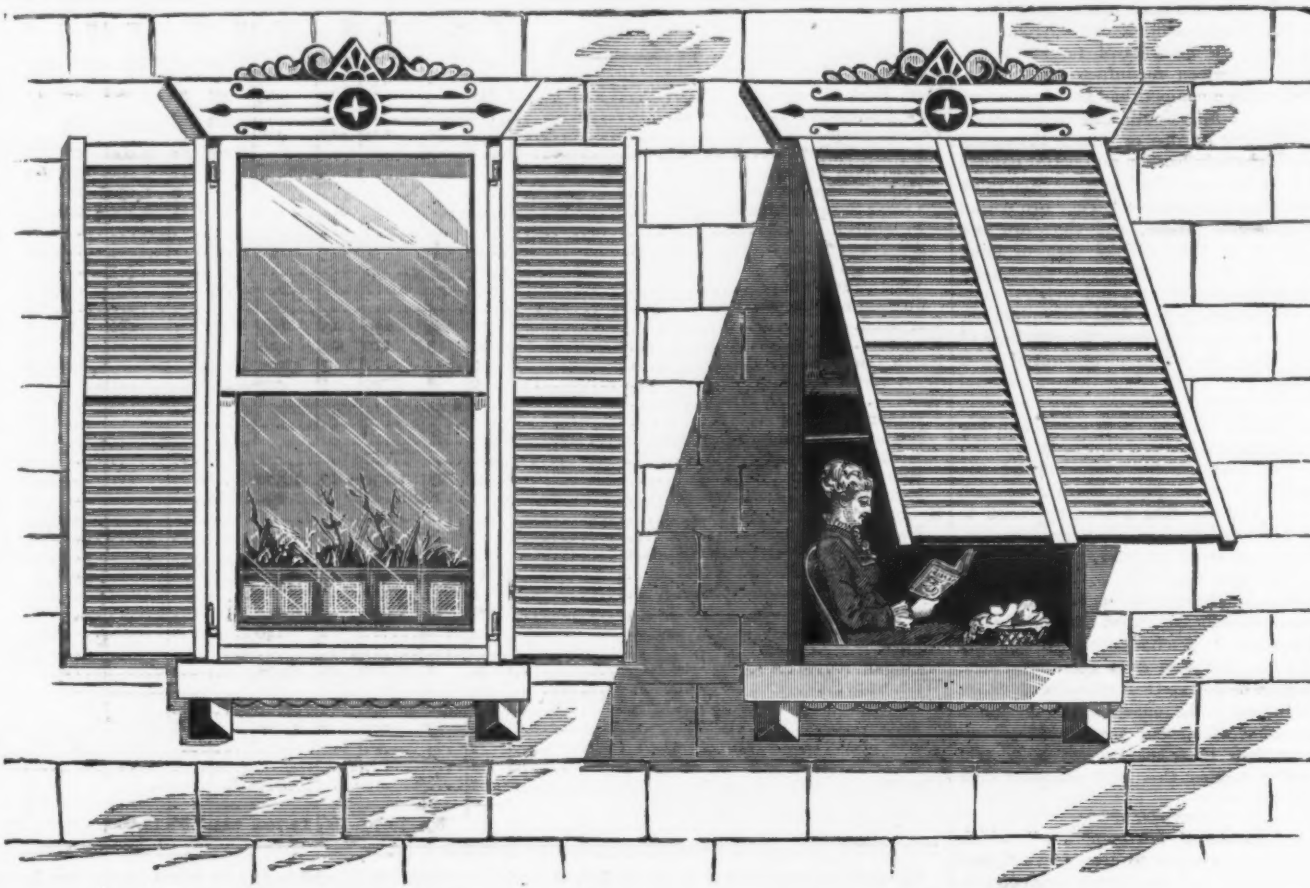
LONDON, October 15.—One hundred thousand pounds in eagles, from Paris, were bought yesterday for New York.



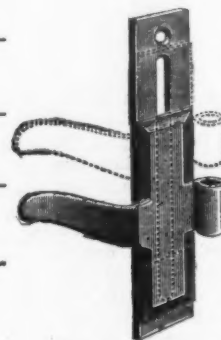
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"STANDARD" KEY.

This Key is composed wholly of sheet or rolled metal, and is made with a round stem, which, forming the bearing for the key when in the lock, renders a separate key hub unnecessary. We call special attention to its peculiar construction, which combines great strength with lightness, and also to its neat and pleasing form. This key is secured to us by letters patent, as follows:

189 520 April 10, 1877.  
189 521 April 10, 1877.  
193 569 July 24, 1877.  
197 684 November 27, 1877.

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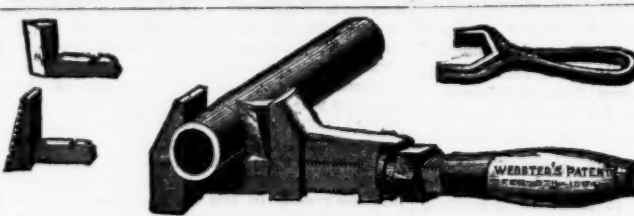


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and  
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(No. 235.)

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed an award in conformity therewith.

PHILADELPHIA, November 8, 1876.

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G. L. REED, Signature of the Judge.

Approval of Group Judges.

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Jas. Bain,  
Chas. Staples,

G. L. Reed,  
J. D. Imboden,

J. Diffenbach,  
Dav. McHardy.

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.  
Given by authority of the United States Centennial Commission.

[L.S.] J. L. CAMPBELL, Secretary. A. T. GOSHORN, Director-General.  
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The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all



Section at Line A B

Section at Line C D

Section at Line E F

Section at Line A

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Estimated to be FIFTY PER CENT. stronger than a Screw as Commonly made.

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To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

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"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."



## THE PARIS EXPOSITION.

## FRANCE AT HER OWN SHOW.

(From our Special Correspondents.)

THE IRON AGE,  
B. 3. American Section Exposition Universelle,  
Paris, Sept. 25, 1878.

To attempt anything like a complete description of the French exhibit of hardware and machinery were to monopolize the columns of *The Iron Age* for several weeks. We shall therefore limit ourselves to gleanings the facts which seem to us most likely to interest our readers. It will not be possible in all cases to follow a well-defined plan in the examination of the exhibits, but we shall try as nearly as we can to present one class of products after another. Before entering the French machine gallery, which occupies more space by itself than that allotted to all the other countries together, let us stop an instant before the exhibits of

## NAILS, TACKS, RIVETS, ETC.

As our readers are aware cut nails are an American invention. In France and throughout the Continent they are very little used, wrought nails and wire nails taking their place almost exclusively. The French nail manufacturers are represented at the Exposition by fourteen exhibits sent from all parts of France, and including numerous varieties of tacks, nails, brads, rivets, horse-shoe nails, &c. Some of these present peculiarities of form which we think may be interesting to dwell upon. Wire nails are employed to a great extent in France. The heads of these are generally flat, though sometimes round. They are made in sizes varying from about 5-16 inch long by 1-24 inch diameter, to 7 inches long by 1-32 inch diameter. Among the wire nails exhibited we notice "false screws." These are simple wire nails with flat countersunk heads. A slit is made in the head, and a shallow thread is cut on the shank in imitation of a screw. Brass, gilt and silver-plated nails are also exhibited.

The following is taken from the price list of E. Buisson, of Paris. We give it as representing the current prices of this class of nails. The prices marked are in francs per 100 kilograms (about 220 lbs.). The numbers in the first column represent the length of the nail in millimeters:

| FLAT HEADS. |     |
|-------------|-----|
| Length.     | No. |
| 27          | 1   |
| 32          | 2   |
| 37          | 3   |
| 42          | 4   |
| 47          | 5   |
| 52          | 6   |
| 57          | 7   |
| 62          | 8   |
| 67          | 9   |
| 72          | 10  |
| 77          | 11  |
| 82          | 12  |
| 87          | 13  |
| 92          | 14  |
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## B. KREISCHER & SONS, FIRE BRICK AND CLAY RETORT WORKS.

Established 1845.

Office, foot of Houston Street, East River,  
NEW YORK.The largest stock of Fire Brick of all shapes and  
sizes on hand and made to order at short notice.Cupola Brick, for McKenzie Patent,  
and others. Fire Mortar, Ground Brick, Clay and  
Sand. Superior Kaolin for Rolling Mills and foundries.  
Stone Ware and other Fire Clay and Sand,  
from my own mines at New Jersey and Staten  
Island, by the cargo or otherwise.

## NEWTON & CO.,

Successor to

PALMER, NEWTON &amp; CO.,

ALBANY, N. Y., Manufacturers of

## FIRE BRICK Stove Linings, Range and Heater Linings Cylinder Brick, &c., &c.

## M. D. Valentine & Bro

Manufacturers of

## FIRE BRICK And Furnace Blocks DRAIN PIPE & LAND TILE. Woodbridge, - - - N. J.

## A. HALL & SONS, Perth Amboy, N. J.

ESTABLISHED 1846.

## HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1865.

## FIRE BRICK

of reliable quality for all purposes, manufactured of  
the best New Jersey Fire Clays. Also, Architectural  
Terra Cotta, Fire Clay, Fire Sand, Kaolin, Ground Fire  
Brick and Diamantine Building Brick.

## Brooklyn Clay Retort AND

## FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Bricks, Ga  
House and other Tile, Cupola Brick, &c. Dealers in  
and Miners of Fire Clay and Fire Sand. Clay bank at  
Burr's Creek, New Jersey. Manufacture: Van Dyke,  
Elizabeth, Richards and Partition Sts., Brooklyn, N. Y.  
Office No. 88 Van Dyke St.

## Watson Fire Brick Manufactory

ESTABLISHED 1836.

JOHN B. WATSON, Perth Amboy, New Jersey.

Manufacturer of

## FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries,  
Gas Works, Lime Kilns, Tanneries, Boiler  
and Grate Setting, Glass Works, &c.  
FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE

## HENRY MAURER,

Proprietor of the

## Excelsior Fire Brick & Clay Retort Works,

Manufacturer of FIRE BRICK, HOLLOW  
BRICK AND CLAY RETORTS.WORKS: PERTH AMBOY, NEW JERSEY.  
Office & Depot: 418 to 422 East 23d St., N. Y.

## TROY FIRE BRICK WORKS

Troy, N. Y.,

## JAMES OSTRANDER & SON,

ESTABLISHED 1848.

Manufacturers of

## FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and  
Dealers in Woodbridge Fire Clay and Sand, and Staten  
Island Kaolin.

Established 1864.

## GARDNER BROTHERS,

MANUFACTURERS OF

## STANDARD SAVAGE

Fire Brick, Tile & Furnace Blocks,  
OF ALL SHAPES AND SIZES.Clay Gas Retorts and Retort Settings,  
AND

Miners and Shippers of Fire Clay.

OFFICE: 375 Penn Ave., Pittsburgh, Pa.  
WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

## BORGNER & O'BRIEN,

Manufacturers of

Fire Bricks,  
Clay Gas Retorts,  
Retort Settings,  
Tiles, Blocks, &c., &c.23d St., below Vine,  
PHILADELPHIA.

Eighteen years' practical experience.

CYRUS BORGNER. WM. J. O'BRIEN

## John Carver,

MANUFACTURER OF

## CAULKING IRONS,

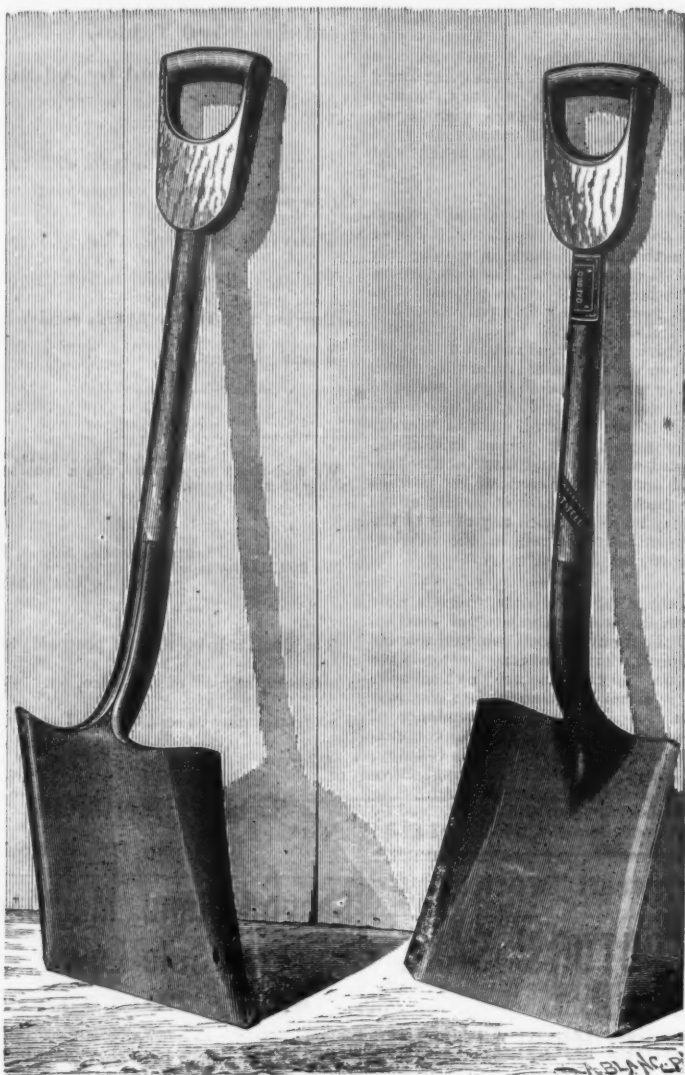
Cotton, Freight and Hay Hooks,  
No. 288 Monroe Street,  
Bet. Jackson & Corleais Sts., NEW YORK.

## TACKLE BLOCKS BURR & CO.,

Manufacturers of Waterman and Russell's  
Patent Iron Strapped Blocks.Also, Manufacturers of  
ROPE STRAPPED BLOCKS.

31 Peck Slip, New York.

## B. ROWLAND & CO., PHILADELPHIA.



## THE OXFORD PATENT WELDED Solid Cast Steel Shovel. OIL TEMPERED.

The Oxford Patent Welded Solid Cast Steel Shovel as now furnished by us, is a new article of manufacture, of a single plate of Cast Steel, without rivets, welded by the Antrim process, with smooth surfaces front and back, and with socket continued some distance up the handle, completely encircling it in the manner of a ferrule, thus insuring a perfectly straight handle. In every instance, and securing the qualities of absolute perfection of strength, and the greatest beauty of construction possible. Taken altogether, our methods will be found to obviate all the defects now so patent in all other Shovels, even those of first-class manufacture, and we will guarantee for them superior strength in parts usually the weakest, perfect symmetry and regularity of appearance, and wearing quality one-third greater than those of any other now made.

The same will apply to our Oxford Patent Welded Solid Cast Steel Spade, Long Handle Round Point Shovel and D Handle Moulder Shovels in every respect.

## OXFORD Warranted Cast Steel.

Goods of this stamp are made of the very best material, and are warranted. We will always replace them with new ones in every case where reasonable satisfaction is not given.

## B. ROWLAND & CO., CITY OFFICE, 27 North Fifth Street, Philadelphia, U. S. A. Works at Frankford, Phila., U. S. A.

NEW YORK WAREHOUSE, 100 Chambers St.

## MACOMBER, BIGELOW & DOWSE, Nos. 156 and 164 Oliver St., Boston, Mass., NEW ENGLAND AGENTS.

they receive the air through the regulator described above.

J. Fau, of Bordeaux, exhibits some rotary engines. These engines are composed essentially of a solid cylinder placed eccentrically within a hollow cylinder and fixed to the shaft. The solid cylinder serves as a rotary piston, and for that purpose is provided with two articulated blades on which the steam acts alternately, thus producing the circular motion. We give the principal dimensions of these engines:

| Number. | Horse-power. | Diameter of piston in millimeters. | Length of cylinder in millimeters. | Length of piston in millimeters. | Area of piston in square millimeters. | Number of revolutions per minute. | Price in francs. |
|---------|--------------|------------------------------------|------------------------------------|----------------------------------|---------------------------------------|-----------------------------------|------------------|
| 0.....  | 1/8          | 30                                 | 25                                 | 40                               | 1                                     | 3,000                             | 100              |
| 1.....  | 1/2          | 40                                 | 50                                 | 80                               | 4                                     | 1,500                             | 300              |
| 2.....  | 1            | 60                                 | 75                                 | 100                              | 7.5                                   | 1,000                             | 400              |
| 3.....  | 2            | 80                                 | 100                                | 150                              | 15                                    | 750                               | 600              |
| 4.....  | 4            | 80                                 | 100                                | 300                              | 30                                    | 750                               | 1,000            |
| 5.....  | 6            | 120                                | 150                                | 300                              | 45                                    | 500                               | 1,200            |
| 6.....  | 9            | 120                                | 150                                | 450                              | 67                                    | 500                               | 1,800            |

### Exhibition Notes.

#### THE CLOSE OF THE FAIR.

The prolongation of the Exhibition for twenty days has been decided upon and stands officially announced. The 20th of November is named for the closing. This project of extension is variously regarded by different exhibitors. As the rule, the army of French expositors, who have up to now been clamorous and troublesome—whom nothing could satisfy and to whom nobody, from the Commissioner General down to the water-sprinklers, was competent—seem very well suited. All, or nearly all, of the foreign exhibitors are opposed—not violently, but by simply resolving to remove their displays on the 1st of November. Mr. Pickering told me yesterday that there were very few of the United States exhibitors who could be prevailed upon to remain after October. The English boast that they made this Exhibition, but are emphatic in denunciation of a postponement of the final day. Some even question the truth of the story, but the fact is pretty well authenticated. When it was announced that the award of the prizes would not take place on the day first agreed, but, instead, had been put off until ten days before the close, the seeds of discontent quickly ripened. A knowledge of this discordant spirit induced the administration to take the course which it is reported to have taken, on the ground of allowing those participating to profit by their prizes. It was claimed with good reason that ten days was insufficient to give them the full benefit of these, for in that short time the general public could not be well informed of the result.

#### SHALL PARIS HAVE A PERMANENT EXHIBITION?

Propositions come in thick and fast advocating making the fair a permanent one. There is nothing extraordinary in that, for it is a part of the history of every international exhibition that, as its closing days draw near, scores of men step up and advocate an exactly similar move to that which some of the Parisians are urging now. Philadelphia did not escape, and there is to-day at Fairmount Park a very lean shadow of the great Centennial. Of all these propositions there is but one that has attracted any widespread attention. It is not entirely impracticable, as most of the others are, and then it comes from a man whose name is a guarantee that anything he may advance will receive respectful audience—E. de Girardin. (A Paris wit once characterized him as a man who rises at four o'clock each day to make enemies.) Girardin wants the exhibition reopened May 1, 1879, and turned into a kind of international bazaar, thereby making it profitable to those who take part, as well as instructive to visitors, since he believes the merchants will all show new goods. In the time between now and then he suggests that a reclassification be made, a permanent management put in charge and new exhibitors allowed to enter. He thinks that his Exposition of 1879 will profit by the shortcomings of the one of this year. With new commissioners appointed by the various nations, if such a course be thought advisable, and the prestige already secured, he does not see why the commerce of every people taking part may not be extended and the most beneficial results accrue from the scheme. Political enemies assign political motives of an unfriendly nature to Girardin, and pronounce his idea thoroughly impracticable and impossible. There are others who do not want to turn the field of Mars into a field for displays other than those sacred to the god after which it is named. It certainly seems too bad to tear down such elaborate and magnificent structures as we have now—built as if they were to be permanent monuments, not playthings of a brief six months—but it will undoubtedly come, and Girardin's scheme will fall with the structures it hopes to save.

#### THE NATIONAL LOTTERY.

More articles have been given by the United States exhibitors to the National Lottery, and many more bought by the purchasing committee. D. H. Wilson & Co., of New York, gave everything in their case of woodenware but one piece of each pattern. Four sewing machines were offered, and five more were bought. The carpets of the Bigelow Company, and Alex. Smith's Sons were purchased at a nominal price. W. & B. Douglas, Middletown, Conn., gave one of their pumps; three were also bought. One of the clever little American type-writers and several of the American organs are in the list of purchases. Each of the scale people—Fairbanks and Howe—gave one, and from each one was bought. The Northfield Company's cutlery case was also drawn upon by the buying commissioners, who might have done a much worse thing. The success of the lottery is something extraordinary. The third million of tickets is now on sale. A few days ago, says the France, the call for tickets was so great that they could not be printed sufficiently fast to meet the demand. Of course such a state of affairs did not last long. We have already stated that the object of the lottery is to pay the expenses of bringing to the Exhibition deserving and intelligent workmen who have not the means.

#### THE VISITING MECHANICS.

Yesterday the commission charged with the disbursement of the funds perfected every arrangement for systematic sight-seeing by the workmen. Each party will be accompanied by a competent person, who will briefly point out the various objects of interest in the special groups which are to be visited for study. Six hundred and eighty-nine artisans who are having their expenses paid by the State out of the lottery fund have just arrived. They came from twenty-three different departments.

#### THE ATTENDANCE.

The average attendance for the month of September was about 110,000. Over 150,000 entries were registered on the 22d. This increase from the attendance during the summer months is easily explained, namely, cooler weather and a realization that the end approaches. Between the 16th and 25th of September a few less than 18,000 foreigners arrived in Paris. From England, 5,419; Belgium, 2,939; Germany, 2,102; Italy, 1,251; United States, 1,016; Spain, 1,005. The remainder were from Switzerland, Holland, Austria, Russia, Luxembourg, Poland, Sweden and Norway, Denmark, Portugal, Roumania, Algeria, Greece, Turkey, Brazil, the French colonies, Canada, Egypt, India, Mexico, Ecuador, Peru, Chili, Japan, China, Colombia, Uruguay, Venezuela, Guatemala, San Salvador, Paraguay, Persia, Tunis, Costa Rica, Oceania and Nicaragua—truly an international exhibition!

#### Gossip about American Competition and the Exposition of 1878.

The wide extent to which I note that our street cars are being adopted in England should, together with the Exhibition at Paris of some of our car wheels and wheels for railroad use, contribute to the stirring up of a business with that country in first-class wheels. These ought to be sold suitable for street cars to the few firms who, so far as I know, are yet making street cars in England. The prejudice which the English people have so long entertained against cast wheels for any use I find still existing here, notwithstanding all the efforts, more than ten years ago, by Mr. W. W. Evans on behalf of the Burnham Richardson Co. of Connecticut; but the specimens of chilled disk railway wheels, and more particularly wheels made of pure Salisbury iron, shown by this company at the Exposition, will do much to pull down that prejudice. The Lobdell Car Wheel Company's goods, made at Wilmington, Del., were carefully scrutinized by the Europeans who are concerned in the tram-car business. This last firm did wisely also to show in Paris the stack of calendering rolls, intended to be part of a complete paper machine, with which we are familiar in connection with the Centennial. The depth to which these rolls are chilled occasioned in my hearing surprise from Englishmen who are accustomed to look for only a comparative film as the working surface of a chilled roll. The truth of these rolls, which makes them when placed together bear upon each other throughout the entire length, merited, as it secured, expressions of delight from visitors of experience in roll casting. Belgium and England, as well as France, should, I think, be markets for these calendering rolls.

One was gratified at the excellent show of scales, trucks and baggage barrows and the like which was made by the Brandon Manufacturing Co., Brandon, Vt., who, I need hardly say, make the Howe scale; and of weighing machines by E. & T. Fairbanks & Co., St. Johnsbury, Vt. I should assume that both these concerns, who have each establishments or agencies in London, ought from the very excellence of their goods to find customers in Europe, especially among the agriculturists. All machines particularly handy in the fold yard and the cattle pen will be in request in Europe until the scarcity of cattle there has been removed by the attention to the growing of meat which must follow upon the high prices to be obtained in the chief towns for good meat of any sort. The meat they serve up in England and Scotland at the chief hotels is mostly prime in quality, and it is not murdered in the cooking; but they know, do these hotel keepers, how to charge for it. I have often thought that they looked upon a man from the States as a fit subject to be operated upon in that way. Perhaps they think that all who come over possess either oil wells or silver mines. But the English hotel keepers are moderation itself in their bill of fare charges by comparison with the syndicate of hotel keepers who are mostly reaping a splendid harvest from the visitors to the world's show in Paris. But the restaurant keepers within the Exposition inclosure are they who have not yet learned how to charge enough to an American or any one else.

I venture to think that there was scarcely a stand in our machinery section which more attracted the attention and the admiration, not unmixed with surprise, of the European visitors than that of Brown & Sharpe Manufacturing Company. The specimens of their machines and tools, and of their standard rules, cast-steel try squares, and so forth, which they spread out brought back the Centennial again very vividly. There was scarcely an occasion as I passed this raised stall when inquiries and examinations were not making by people who, knowing what they were looking at, seemed as much surprised as delighted with the completeness and the finish of the different machine tools, and the accuracy and delicacy of the minutely marked squares, rules and gauges. The splendid factory at Providence, R. I., did much to uphold the fame of the U. S. for machine tools of the nicest capability. If the inquiries which were made at the stall should lead to business in the proportion of only 20 per cent., the firm must be required for sending to Paris. Perhaps no American firm displayed a larger variety than was displayed by W. & B. Douglas, from whose pump factory at Middletown, Conn., there was sent a collection of pumps and hydraulic machinery which seemed fairly to stagger visitors having only a very contracted knowledge of our manufactures. There were, however, others who had knowledge of these



**HARDWARE,**  
P. O. Box 1051, Boston.

ated to clean 5000 boxes per day. Machines can be  
seen at the inventor's.  
J. MANNEBACH,



# Trade Report.

Office of THE IRON AGE,  
WEDNESDAY EVENING, Oct. 16, 1878.

There have been several exciting events in the money market during the past week, with a marked effect upon the gold premium, which advanced to 101½ but has since receded to 100½, at which it closes to-day. The failure of a heavy London mercantile house, with liabilities of \$10,000,000, was the primary cause of an advance in the Bank of England rate. At the opening of the current week the market was in a decidedly panicky condition, but it was afterward relieved by the action of the treasury in ordering the prepayment of the 5-20's called in for redemption, and later on the market has been decidedly better.

Money has been more active and higher, with call loans at 3 @ 6% and prime mercantile paper 5 @ 7½.

The Stock Exchange has been excited over the failure on Tuesday of Messrs. Haas & Co., with very heavy liabilities. Their failure brings out charges against them of fraud from another prominent house, which they, in turn, countercharge with dishonorable dealings, all of which is to be investigated by the Stock Exchange.

Government bonds have remained steady, though there have been heavy importations of them during the week.

The stock market is quiet and closes rather heavy, partly in consequence of the distrust created by Tuesday's developments.

The bank statement shows a reduction in the surplus reserve to \$3,531,600 from \$7,436,050 last week.

## IMPORTS.

For week ended Oct. 12:

|                 | 1876.        | 1877.        | 1878.        |
|-----------------|--------------|--------------|--------------|
| Total for week. | \$5,220,676  | \$5,688,223  | \$5,704,676  |
| Prev. reported. | \$25,900,401 | \$25,130,311 | \$25,908,380 |

Since Jan. 1. . . . . \$31,130,077 \$26,818,531 \$27,613,056

Included in the imports of general merchandise were articles valued as follows:

|                     | Quantity. | Value.  |
|---------------------|-----------|---------|
| Anyvils.            | 150       | \$1,497 |
| Brass goods.        | 22        | 9,941   |
| Bronzes.            | 60        | 14,436  |
| Chains and anchors. | 67        | 3,534   |
| Copper.             | 73        | 18,600  |
| Cutlery.            | 72        | 22,616  |
| Guns.               | 31        | 8,801   |
| Hardware.           | 4         | 391     |
| Iron, sheet, tons.  | 10        | 1,137   |
| Iron, other, tons.  | 10        | 18,600  |
| Metal goods.        | 114       | 17,620  |
| Nails.              | 10        | 1,684   |
| Needles.            | 10        | 4,696   |
| Old metal.          | 205       | 205     |
| Platina.            | 2         | 2,108   |
| Plated ware.        | 65        | 65      |
| Per. caps.          | 15        | 2,853   |
| Saddlery.           | 123       | 712     |
| Steel.              | 712       | 6,547   |
| Silverware.         | 6         | 343     |
| Tin, bxs.           | 47,394    | 230,995 |
| Tin slabs.          | 939       | 11,497  |
| Wire.               | 407       | 407     |
| Zinc.               | 10,041    | 822     |

## EXPORTS, EXCLUSIVE OF SPECIES.

For week ended Oct. 12:

|                 | 1876.        | 1877.        | 1878.        |
|-----------------|--------------|--------------|--------------|
| For the week.   | \$4,941,561  | \$5,941,568  | \$6,828,004  |
| Prev. reported. | \$23,748,513 | \$25,921,674 | \$26,627,972 |

Since Jan. 1. . . . . \$29,886,494 \$22,863,242 \$27,546,876

## EXPORTS OF SPECIES.

For week ended Oct. 12:

|  | Total for week. | Previously reported. |
|--|-----------------|----------------------|
|  | \$171,211       | 10,646,184           |

|  | Total since Jan. 1, 1878. | Same time in 1877. | Same time in 1876. |
|--|---------------------------|--------------------|--------------------|
|  | \$10,797,395              | \$3,307,116        | \$2,474,053        |
|  | \$10,797,395              | \$3,307,116        | \$2,474,053        |
|  | \$10,797,395              | \$3,307,116        | \$2,474,053        |
|  | \$10,797,395              | \$3,307,116        | \$2,474,053        |
|  | \$10,797,395              | \$3,307,116        | \$2,474,053        |

Government bonds at the close were quoted as follows:

|                            | Bid. | Asked. |
|----------------------------|------|--------|
| U. S. Currency 6's.        | 119  | 119½   |
| U. S. 6's 1881 registered. | 107½ | 107¾   |
| U. S. 6's 1881 coupon.     | 107½ | 107¾   |
| U. S. 6's 1885 new reg.    | 104½ | 104¾   |
| U. S. 6's 1885 coupon.     | 104½ | 104¾   |
| U. S. 6's 1887 reg.        | 104½ | 104¾   |
| U. S. 6's 1887 coupon.     | 104½ | 104¾   |
| U. S. 6's 1888 reg.        | 104½ | 104¾   |
| U. S. 6's 1888 coupon.     | 104½ | 104¾   |
| U. S. 10-40 coupon.        | 105½ | 105¾   |
| U. S. 4's 1881 registered. | 104½ | 104¾   |
| U. S. 4's 1881 coupon.     | 104½ | 104¾   |
| U. S. 4's 1887 registered. | 104½ | 104¾   |
| U. S. 4's 1887 coupon.     | 104½ | 104¾   |

The following are the closing quotations for active shares:

|                                   | Bid. | Asked. |
|-----------------------------------|------|--------|
| Atlantic and Pacific Telegraph.   | 26   | 27     |
| Chicago and Northwest.            | 40½  | 40¾    |
| Chicago, Rock Island and Pacific. | 71½  | 71¾    |
| Chicago, Bur. and Quincy.         | 100  | 100½   |
| Col. Chicago and Ind. Central.    | 34   | 34½    |
| Col. Chicago and Ind. Central.    | 34   | 34½    |
| Cleveland and Pittsburgh.         | 81   | 81½    |
| Chicago and Alton.                | 80½  | 81     |
| " " Pref.                         | 104  | 104½   |
| Canton.                           | 20   | 20½    |
| Delaware, Lack. and Western.      | 31½  | 31¾    |
| Delaware and Hudson Canal.        | 29½  | 29¾    |
| Express-Adams.                    | 107  | 107½   |
| " American.                       | 48   | 48½    |
| " Wells, Fargo & Co.              | 48   | 48½    |
| Erie.                             | 11   | 11½    |
| Harlem.                           | 135  | 135½   |
| Hannibal and St. Joseph.          | 14   | 14½    |
| Illinois Central.                 | 76½  | 76¾    |
| Kansas and Texas.                 | 34   | 34½    |
| Lake Shore.                       | 67½  | 67¾    |
| Michigan Central.                 | 82½  | 82¾    |
| Morris and Essex.                 | 82½  | 82¾    |
| Milwaukee and St. Paul.           | 30½  | 30¾    |
| " " Pref.                         | 65   | 65½    |
| New York Central.                 | 111  | 111½   |
| New Jersey Central.               | 24½  | 24¾    |
| Ohio and Mississippi.             | 7½   | 7¾     |
| Pacific Mail.                     | 15½  | 15¾    |
| Pittsburgh and Fort Wayne.        | 121  | 121½   |
| Quicksilver.                      | 97   | 97½    |
| " " Pref.                         | 34   | 34½    |
| St. Louis and Iron Mountain.      | 11½  | 11¾    |
| St. Louis Kansas City Northern.   | 42½  | 42¾    |
| " " Pref.                         | 21   | 21½    |
| Toledo, Wabash & Western.         | 10½  | 10¾    |
| Union Pacific.                    | 66   | 66½    |
| Western Union Telegraph.          | 90½  | 90¾    |

## GENERAL HARDWARE.

There is little, if any, change to note in the business situation this week compared with last. A few of our city houses report a slight falling off in the bulk of orders received, but the majority speak encouragingly of present and prospective business. There are few changes in values to report. The screw manufacturers held a meeting in this city to-day, and adjourned without, so far as we can learn, accomplishing anything. The prices of Wood Screws remain as before.

The demand for Nails has fallen off considerably and the tone of the market is weak, although no change in price is announced. We hear of sales in round lots at a shade below our quotations; we, however, still quote \$2.15, net, for 10d. to 6d., which is the lowest figure we have heard of for lots of 25 to 100 kegs.

In the advertisement of Henry Daston & Sons' File Company (Limited), which appeared in our issue of 3d inst., the caption on the cut "Mill Saw File, Second Cut, 3 inch," was wrong. It should have been "Mill Saw File, Bastard Cut, 3 inch." As the cuts shown in their advertisement of these goods are as exact fac similes of the Files as it is possible to show on paper, this error, unless explained, might possibly lead to a misconception of the technical term for the File referred to. In their advertisement on page 29 the File is shown under its proper title.

Sargent and Co. have issued the following circular:

Cast-Iron Butt Hinges.—Discounts.

Please change over September, 1878, Discount Sheet as follows:

| Page in 1877                        | Discount |
|-------------------------------------|----------|
| 1, No. 10, Broad, Fast Joint Butts. | 65       |
| 2, No. 10, Broad, " " " "           | 65       |
| 3, No. 10, Broad, " " " "           | 65       |
| 4, No. 10, Broad, " " " "           | 65       |
| 5, No. 10, Broad, " " " "           | 65       |
| 6, No. 10, Broad, " " " "           | 65       |
| 7, No. 10, Broad, " " " "           | 65       |
| 8, No. 10, Broad, " " " "           | 65       |
| 9, No. 10, Broad, " " " "           | 65       |
| 10, No. 10, Broad, " " " "          | 65       |
| 11, No. 10, Broad, " " " "          | 65       |
| 12, No. 10, Broad, " " " "          | 65       |
| 13, No. 10, Broad, " " " "          | 65       |
| 14, No. 10, Broad, " " " "          | 65       |
| 15, No. 10, Broad, " " " "          | 65       |
| 16, No. 10, Broad, " " " "          | 65       |
| 17, No. 10, Broad, " " " "          | 65       |
| 18, No. 10, Broad, " " " "          | 65       |
| 19, No. 10, Broad, " " " "          | 65       |
| 20, No. 10, Broad, " " " "          | 65       |
| 21, No. 10, Broad, " " " "          | 65       |
| 22, No. 10, Broad, " " " "          | 65       |
| 23, No. 10, Broad, " " " "          | 65       |
| 24, No. 10, Broad, " " " "          | 65       |
| 25, No. 10, Broad, " " " "          | 65       |
| 26, No. 10, Broad, " " " "          | 65       |
| 27, No. 10, Broad, " " " "          | 65       |
| 28, No. 10, Broad, " " " "          | 65       |
| 29, No. 10, Broad, " " " "          | 65       |
| 30, No. 10, Broad, " " " "          | 65       |
| 31, No. 10, Broad, " " " "          | 65       |
| 32, No. 10, Broad, " " " "          | 65       |
| 33, No. 10, Broad, " " " "          | 65       |
| 34, No. 10, Broad, " " " "          | 65       |
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| 36, No. 10, Broad, " " " "          | 65       |
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| 38, No. 10, Broad, " " " "          | 65       |
| 39, No. 10, Broad, " " " "          | 65       |
| 40, No. 10, Broad, " " " "          | 65       |
| 41, No. 10, Broad, " " " "          | 65       |
| 42, No. 10, Broad, " " " "          | 65       |
| 43, No. 10, Broad, " " " "          | 65       |
| 44, No. 10, Broad, " " " "          | 65       |
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| 46, No. 10, Broad, " " " "          | 65       |
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| 60, No. 10, Broad, " " " "          | 65       |
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| 62, No. 10, Broad, " " " "          | 65       |
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| 68, No. 10, Broad, " " " "          | 65       |
| 69, No. 10, Broad, " " " "          | 65       |
| 70, No. 10, Broad, " " " "          | 65       |
| 71, No. 10, Broad, " " " "          | 65       |
| 72, No. 10, Broad, " " " "          | 65       |
| 73, No. 10, Broad, " " " "          | 65       |
| 74, No. 10, Broad, " " " "          | 65       |
| 75, No. 10, Broad, " " " "          | 65       |
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| 77, No. 10, Broad, " " " "          | 65       |
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| 79, No. 10, Broad, " " " "          | 65       |
| 80, No. 10, Broad, " " " "          | 65       |
| 81, No. 10, Broad, " " " "          | 65       |
| 82, No. 10, Broad, " " " "          | 65       |
| 83, No. 10, Broad, " " " "          | 65       |
| 84, No. 10, Broad, " " " "          | 65       |
| 85, No. 10, Broad, " " " "          | 65       |
| 86, No. 10, Broad, " " " "          | 65       |
| 87, No. 10, Broad, " " " "          | 65       |
| 88, No. 10, Broad, " " " "          | 65       |
| 89, No. 10, Broad, " " " "          | 65       |
| 90, No. 10, Broad, " " " "          | 65       |
| 91, No. 10, Broad, " " " "          | 65       |
| 92, No. 10, Broad, " " " "          | 65       |
| 93, No. 10, Broad, " " " "          | 65       |
| 94, No. 10, Broad, " " " "          | 65       |
| 95, No. 10, Broad, " " " "          | 65       |
| 96, No. 10, Broad, " " " "          | 65       |
| 97, No. 10, Broad, " " " "          | 65       |
| 98, No. 10, Broad, " " " "          | 65       |
| 99, No. 10, Broad, " " " "          | 65       |
| 100, No. 10, Broad, " " " "         | 65       |

Since Jan. 1. . . . . \$31,130,077 \$26,818,531 \$27,613,056

Included in the imports of general merchandise were articles valued as follows:

|                     | Quantity. | Value.  |
|---------------------|-----------|---------|
| Anyvils.            | 150       | \$1,497 |
| Brass goods.        | 22        | 9,941   |
| Bronzes.            | 60        | 14,436  |
| Chains and anchors. | 67        | 3,534   |
| Copper.             | 73        | 18,600  |
| Cutlery.            | 72        | 22,616  |
| Guns.               | 31        | 8,801   |
| Hardware.           | 4         | 391     |
| Iron, sheet, tons.  | 10        | 1,137   |
| Iron, other, tons.  | 10        | 18,600  |
| Metal goods.        | 114       | 17,620  |
| Nails.              | 10        | 1,684   |
| Needles.            | 10        | 4,696   |
| Old metal.          | 205       | 205     |
| Platina.            | 2         | 2,108   |
| Plated ware.        | 65        | 65      |
| Per. caps.          | 15        | 2,853   |
| Saddlery.           | 123       | 712     |
| Steel.              | 712       | 6,547   |
| Silverware.         | 6         | 343     |
| Tin, bxs.           | 47,394    | 230,995 |
| Tin slabs.          | 939       | 11,497  |
| Wire.               | 407       | 407     |
| Zinc.               | 10,041    | 822     |

## EXPORTS, EXCLUSIVE OF SPECIES.

For week ended Oct. 12:

|  | Total for week. | Previously reported. |
|--|-----------------|----------------------|
|  | \$171,211       | 10,646,184           |

## EXPORTS OF SPECIES.

For week ended Oct. 12:

|  | Total for week. | Previously reported. |
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|                            | Bid. | Asked. |
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| U. S. 6's 1885 coupon.     | 104½ | 104¾   |
| U. S. 6's 1887 reg.        | 104½ | 104¾   |
| U. S. 6's 1887 coupon.     | 104½ | 104¾   |
| U. S. 6's 1888 reg.        | 104½ | 104¾   |
| U. S. 6's 1888 coupon.     | 104½ | 104¾   |
| U. S. 10-40 coupon.        | 105½ | 105¾   |
| U. S. 4's 1881 registered. | 104½ | 104¾   |
| U. S. 4's 1881 coupon.     | 104½ | 104¾   |
| U. S. 4's 1887 registered. | 104½ | 104¾   |
| U. S. 4's 1887 coupon.     | 104½ | 104¾   |

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|                                   | Bid. | Asked. |
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| Col. Chicago and Ind. Central.    | 34   | 34½    |
| Cleveland and Pittsburgh.         | 81   | 81½    |
| Chicago and Alton.                | 80½  | 81     |
| " " Pref.                         | 104  | 104½   |
| Canton.                           | 20   | 20½    |
| Delaware, Lack. and Western.      | 31½  | 31¾    |
| Delaware and Hudson Canal.        | 29½  | 29¾    |
| Express-Adams.                    | 107  | 107½   |
| " American.                       | 48   | 48½    |
| " Wells, Fargo & Co.              | 48   | 48½    |
| Erie.                             | 11   | 11½    |
| Harlem.                           | 135  | 135½   |
| Hannibal and St. Joseph.          | 14   | 14½    |
| Illinois Central.                 | 76½  | 76¾    |
| Kansas and Texas.                 | 34   | 34½    |
| Lake Shore.                       | 67½  | 67¾    |
| Michigan Central.                 | 82½  | 82¾    |
| Morris and Essex.                 | 82½  | 82¾    |
| Milwaukee and St. Paul.           | 30½  | 30¾    |
| " " Pref.                         | 65   | 65½    |
| New York Central.                 | 111  | 111½   |
| New Jersey Central.               | 24½  | 24¾    |
| Ohio and Mississippi.             | 7½   | 7¾     |
| Pacific Mail.                     | 15½  | 15¾    |
| Pittsburgh and Fort Wayne.        | 121  | 121½   |
| Quicksilver.                      | 97   | 97½    |
| " " Pref.                         | 34   | 34½    |
| St. Louis and Iron Mountain.      | 11½  | 11¾    |
| St. Louis Kansas City Northern.   | 42½  | 42¾    |
| " " Pref.                         | 21   | 21½    |
| Toledo, Wabash & Western.         | 10½  | 10¾    |
| Union Pacific.                    | 66   | 66½    |
| Western Union Telegraph.          | 90½  | 90¾    |

Speaking Tube Whistles, Octagon Styles. per doz.  
No. 5, Whistle with Indicator, Japanese Body, Round Nickel Mouthpiece. \$12.50  
No. 6, Whistle with Indicator, Nickel Body, Round Nickel Mouthpiece. 11.50  
No. 7, Whistle with Indicator, Nickel Body, Round Nickel Mouthpiece. 12.50  
No. 8, Whistle without Indicator,



## COAL.

During the past week the public have been much disturbed by rumors of a break in the combination. These have had more or less effect upon trade and have tended somewhat to make retail buyers shy. The rumors of a break come from the discussion of the question as to whether the combination should be continued until April or expire by limitation at the end of the year. Most Coal men desired to see the end of the combination, because they anticipate a war to the knife, a great struggle for the markets and a consequent fall in the prices of Coal below a paying point. The Lehigh people are strong in their opinion that their percentage is too small. There seems to be a pretty general feeling among them that it will be folly to enter another combination without having a different basis for estimating their quota. How firmly they are fixed in this opinion remains to be seen. That their quota has been much too small for their trade in the larger sizes seems to be beyond a doubt. Whether the other companies are willing to make any concessions is doubtful, and the chances are rather against it. Yesterday the Board of Control met in this city and decided to increase the tonnage for the present month to 600,000 tons, making the total for October 1,800,000. For November the quota is to be 1,200,000 tons. The question of continuing the combination until April also came up, but nothing was decided upon, and the matter was referred to a committee. The retailers are naturally somewhat uncertain as to the future of the market, and seem generally to incline to the policy of having no stock by the middle of December at least, preferring to begin the year with empty yards. Freight rates are still and are slowly advancing. We quote 95¢ @ \$1 to Boston, 60¢ to New Haven, with vessels and boats scarce. River freights and towing are higher, with a scarcity of boats.

## PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Oct. 15, 1878.

There appears to be a decided improvement in business, judging by the activity at most of the leading manufacturing establishments. Whether it is the commencement of a genuine revival or simply a spurt remains to be seen. In visiting the leading firms since Saturday we gather as follows: The Baldwin Locomotive Works have today received an order for thirteen locomotives for the New York Elevated Railway, four locomotives for South America and some important work for various Western roads. William Sellers & Co., in addition to other liberal orders, have recently received one from New South Wales for machines and tools amounting to upward of \$40,000. They report prospects quite encouraging. W. B. Bement & Son also make a similar report. At the Bush Hill Iron Works some very good orders have been received during the past few weeks and prospects are considered reasonably good. Hoopes & Townsend also report favorably of business during the past few weeks, and anticipate a fair amount of activity during the winter. Neafie & Levy are quite busy at present, having under way a 2000-ton iron steamship for the Cuban trade and a good deal of work connected with marine engines, boilers, &c. The Wm. Cramps Sons are still pushed to the utmost in finishing up work on the Russian vessels, and for some months past have had at least 2000 men on the pay roll. They do not report so favorably in regard to new business, but expect that the character of their work will bring orders at an early date. I. P. Morris & Co. also report favorably; have had a good summer's business, and have fair prospects for the winter months. At Chester, Roach & Son are about commencing on two new iron vessels, which will be good news in that vicinity, as the working staff for some months has been nearly 1000 below the average of last year. At the office of the Reading Iron Works we learn that they are full in all their departments, with excellent prospects for the near future. In steam engines there is a considerable business doing. At the shops of Chas. W. Ervien & Co., we found several in process of construction for California, besides others for parties nearer home. J. W. Paxson & Co. (Foundry Facings), whose trade in their line is very extensive, report a more general demand than they have had for some time; orders are small but numerous. In regard to the Iron trade generally we refer our readers to the detailed reports herewith.

**Pig Iron.**—We have again to report a week of moderate activity in small lots, but the aggregate tonnage has not been more than a fair average. For large lots there is but little inquiry, and as stated in our recent reports, transactions of this kind can be effected only when figures are placed much below the general market rates. We cannot learn, however, of any large parcels being offered; first, because there are no accumulations of stock to render such a course necessary, and second, because sellers know that buyers could not be found at any reasonable price. From the activity above noted in the demand for small lots of good Foundry Irons, it may be inferred that business is a little better, and from careful inquiry such appears to be the fact. We cannot learn that any one has large orders on hand, but there is a general brightening up, and since the first of the month nearly all of the leading consumers report a very satisfactory business, with inquiries which look like continued activity. The Pig Iron trade is in a condition to be easily affected by any improvement in general business. Stocks are light of good brands of Iron, both in consumers' and producers' hands, and if an active demand for Iron products is sustained for any length of time prices cannot fail to improve. At present, however, there is not the slightest apprehension of any advance, and if values of to-day are maintained during the balance of the year the trade will be quite satisfied. Not that there is any money in it at present rates, but if a shrinkage is avoided until the first of the year better prices may be certainly expected toward spring. We quote: Select No. 1 Foundry Iron, \$18 @ \$19,

ordinary Lehigh brands; No. 1 Foundry, \$17 @ \$18; No. 2 Foundry, \$16 @ \$16.50; Gray Forge, \$15 @ \$16; White and Mottled, \$14.

**Ores.**—The Chester Iron Co. have this day reduced prices 25¢ per ton, as per advertisement on page 5.

**Blooms.**—The market is heavy, and sales can only be effected in quantity by shading prices. For small lots we quote: Sunken Scrap Blooms (2464 lb), \$38 @ \$39; Northern Ore Blooms (2240 lb), \$33 @ \$37; best quality Charcoal Billets (2240 lb), for wire and steel purposes, \$58 @ \$60; Bars do., \$62.50 @ \$65; Sheet Iron Blooms, cornered (2464 lb), \$53 @ \$55; Cold-blast Charcoal Plate Blooms, \$50 @ \$53; run-out Anthracite, \$45 @ \$47.50.

**Muck Bar.**—Only small lots have been sold during the week at about medium figures. There are some inquiries for large lots, and in another direction we hear of bids being solicited for a lot of 2000 tons or any part of it. We quote \$30 @ \$33, according to quality.

**Structural Iron.**—The market so far as actual sales is concerned is rather quiet, and only a few small orders have been entered. There is a moderate amount of inquiry, however, and it is expected that orders for 1000 to 1500 tons of Beams, Angles, &c. will be closed within a few days. The Beams are wanted partly in New York and Boston, and will be used in connection with extensions going on in some large breweries. There is also some demand for bridge purposes, which, with uncompleted contracts in connection with the elevated railways, will keep the mills fully employed for some time to come. Prices are steady and unchanged, as follows: Angles, 2.2¢ @ 2.4¢; Tees, 2.4¢ @ 2.5¢; Beams and Channels, 2.7¢ @ 2.8¢.

**Plate and Tank Iron.**—There has been a slight reaction in the demand for heavy Plate Iron, but as the mills have a considerable amount of work on hand, a little temporary dullness is scarcely noticed. Some of the mills are running their orders off pretty rapidly, but there are indications of a renewed demand for large lots before the close of the month. We are in a position to state that two new vessels will be immediately commenced at the Chester shipyards, which, with another matter requiring several thousand tons of Plate Iron, will effectively prevent any protracted depression in this department of the Iron trade. Prices are steady; the advance noted in our last does not necessitate any change in quotations, as they actually represent the market. Previously they were nominal and business was done (as then stated) at from \$2 to \$3 per ton below the asking rates. We quote: Common Plates, 2.2¢ @ 2.3¢; Tank Iron, 2.3¢ @ 2.5¢; C. No. 1, 2.4¢ @ 2.6¢; Shell Iron, 2.75¢ @ 2.9¢; Flange Iron, 3.7¢ @ 4¢; Solid Firebox, 4.85¢ @ 5¢, and Best Bloom, 5.5¢ @ 6¢.

**Sheet Iron.**—The demand continues to be as active as noted last week, and the mills are running to their utmost capacity. Had it not been for the very large stocks carried by manufacturers it would have been impossible to meet the demand. From present indications the year will close with empty warehouses and less stock on hand than has been the case for several years past. Prices are steady, but sellers show no disposition to advance quotations, which, however, may now be regarded as actual selling prices. We quote: Common Sheet, No. 20 to 23, 2.8¢ @ 2.9¢; No. 24 to 26, 2.9¢ @ 3¢; No. 27 to 28, 3.1¢ @ 3.15¢; Best Refined Sheet, No. 25 to 28, 3.2¢ @ 3.3¢; No. 22 to 24, 3.1¢ @ 3.2¢; No. 16 to 21, 3.0¢ @ 3.1¢; Best Bloom Sheets, No. 25 to 28, 5.1¢ @ 5.2¢; No. 22 to 24, 5¢; No. 16 to 21, 4.7¢ @ 4.8¢; Refined Plates or Blue Annealed, 5-16 to 16, 2.3¢ @ 2.4¢; American, R. G., 5-16 to 16, 2.9¢ @ 3¢; Best Bloom, 5-16 to 16, 4.8¢ @ 4.9¢; Philadelphia Russia, 6.5¢; A Patent Planished, 10½¢; B Patent Planished, 9½¢; Best Bloom Galvanized, 45¢ discount; second quality, 55¢; extra discounts for large lots.

**Bar Iron.**—As an exception to the other departments of the Iron trade we have to report a very dull market. The activity noted in our late reports seems to have all died out, and in every direction we hear complaints of dullness and inactivity. This is somewhat of a surprise, inasmuch as the improvement seemed to be general a few days ago, and it was hoped would be permanent. For the present, however, the spurt seems to be over, and very little business has been entered during the past few days. The reaction may be only temporary, and as stocks are light and work at the city mills suspended for the time being, there is no pressure to sell unless at regular rates. The advance of \$1 per ton by manufacturers is maintained, although store prices are same as last quoted, viz., 1.9¢ @ 2.0¢ for Best Refined Iron, with other descriptions down to 1.7¢. We understand that the recent order for rolling stock caused purchases of about 5000 tons of Bars for car building purposes.

**Steel Rails.**—There is no change in the condition of the market, as recently noted. Mills are already full of orders for a considerable period ahead, and no orders will be received and no quotations given for deliveries previous to December. There are buyers for winter deliveries at \$42 @ \$42.50, but at present these offers have not been accepted. The rapidly improving condition of many of the leading railways and the heavy traffic render it certain that they will be large buyers, and with the generally healthy outlook in business sellers do not want to mortgage the future too far in advance. In the meantime we quote prices steady at \$43 @ \$45 at mill, according to section of rail, time of delivery and location of mill.

**Iron Rails.**—The activity noted during the past few weeks has resulted in a general advance in prices, and we are informed that \$1.50 per ton advance has been paid for two lots to-day, as compared with sales of same class of Rails a week ago. The mills are full of orders—that is, those which are in operation at all—and one of the largest concerns in Pennsylvania have all they can do up to the 1st of March. Light Rails are in active demand. Two sales, amounting to 400 tons of 16-lb sections, are reported on

Cuban account, and there are several orders in the market of a similar character. The outlook in the Rail trade is of a most encouraging character at present. We quote standard qualities firm at \$33 @ \$36, at mills, according to location, section of rail, &c.

**Old Rails.**—The market appears to have been completely cleared, and we cannot hear of any lots being offered in this market. Buyers are prepared to pay good prices, but no transactions have been reported for several days past. A lot of many thousands tons, recently offered by one of the leading railway companies, is said to have been closed out last Saturday. Such was the reply sent to a leading dealer who telegraphed yesterday to ask lowest cash prices for the lot. The flurry may be over in a little while; meantime there is a positive dearth of Old Rails in this neighborhood, and quotations of \$19.50 @ \$20 for average qualities are based upon sales made some ten days ago.

**Spikes.**—5½ x 9-16, 2¢; ½ x 4 and longer, 2.3¢; 7-16 x 4 and longer, 2.4¢; ¾ x 3½ and longer, 2.7¢; ¾ x 3 and longer, 2.8¢.

**Scrap Iron.**—There is no change to report. Prices are as before. Wrought, \$20 @ 22.50; Cast, \$14 @ \$15.

**Nails.**—The market is dull. Prices are steady and unchanged, \$2.15 being the average price.

**Shot.**—The demand continues brisk at former prices. We quote: American Chilled, 8¢ @ 9¢; Drop, 6½¢ @ 7½¢; Buck, 7½¢ @ 8½¢; all less 10¢ to the trade.

## PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., Oct. 15, 1878.

General business continues to improve slowly, and now that the inflation movement has received a set-back from which it is not likely to recover soon, there is a better feeling in business circles. There has been a very good demand for nearly all leading articles of manufacture here. Some of our manufacturers are busy, and although working up to their full capacity are unable to catch up with their orders. The great source of complaint just now is not so much a want of business as the very small margin for profit. Some of our merchants and manufacturers say they are doing more business now than at any time since the panic, but that they are making very little money. It may appear strange, yet some people still think they ought to make money as rapidly and as easily now as they did during the war times. They are not satisfied with a legitimate business, as it is too slow and there is too much work connected with it.

A serious drawback to general business is the continued suspension of navigation. River transportation is very important to Pittsburgh, especially at this particular time, the cost of freightage being so much less than by rail to nearly all the leading points of distribution. Through this means a great deal of business comes here from the West and South that otherwise would be diverted elsewhere. This being the case, it is not strange that our people are anxious to have the Ohio River improved so as to have it navigable at all seasons, and steps with this object in view have already been taken. The work of building an adjustable dam similar to those in France has already been commenced by the government at Davis' Island. This is being put in as an experiment; if successful the river will no doubt be slack-watered to Cincinnati within the next few years; if not it will have to be taken out of the way. The Coal trade, with but few exceptions, are bitterly opposed to the dam in question, alleging that it will destroy their business; and, indeed, river men generally predict that it will be a failure. Time will tell.

**Pig Iron.**—There has been increased activity during the past week, the volume of business having been larger in the aggregate than during any preceding week for some time, if not this year. The general position of the market, however, remains unchanged. Standard Red-Short all ore Mill Irons continue strong with a continued upward tendency, while Neutral and Cold-Short Irons are bringing no better price, although there is a firmer feeling, caused by the increased demand, as well as the fact that current rates afford little or no profit to the producer. The reported sales of Western Red-Short include 1500 tons at \$19.4 mos.; 150 tons extra all ore ditto at \$19.50, 4 mos.; of coke we can report sales of 2000 tons Forge at \$16.50, 4 mos., and 600 tons ditto at \$16, cash. While the demand for Foundry grades continues light for the season, good brands are getting scarce, and the market is firmer in consequence, with some small sales recently at a slight advance. We quote at \$19 @ \$20, 4 mos., for Nos. 2 and 1 of Bituminous Coal Smelted. Charcoal Irons continue dull, and there is not likely to be any improvement in the demand until they can be sold at about the same price as Coal and Coke Irons, as consumers generally are unwilling to make any difference. In former years the Hoop-Iron mills used considerable Charcoal Pig, but for some years they have been using Coke and Bituminous Coal Smelted, which answers just as well and costs from \$3 to \$5 per ton less. In regard to Bessemer Pig there is nothing new to report. No late sales, in the absence of which we continue to quote the market steady at \$20, 4 mos. Several of our city furnaces are still working on Bessemer, but it is understood that some of them are about through with their Bessemer contracts.

**Manufactured Iron.**—The market for all kinds of finished Irons, as well as nearly all the leading specialties, continues fairly active. Some mills, although working up to their full capacity, are behind with their orders, and prices, in sympathy with the raw article, are strong, with no cutting and (here in Pittsburgh) no disposition to cut. The strike at Philadelphia has without doubt been of advantage to Pittsburgh, as it has increased her business, and by reducing competition enabled her manufacturers to sustain and obtain full prices. However, notwithstanding business is much more active and prices much stronger and considerably better than at the close of the summer, the margin for profit

continues small. Sheet Iron, for which the demand is quite active, as it usually is at this particular season of the year, has been advanced one-tenth of a cent, putting it on an equality with Bars. The Hoop mills are all very busy, and the Bar mills, as a rule, have about all they can do. We continue to quote on a basis of \$1.75, 60 days, for Merchant Bars, with 2% discount for cash.

**Nails.**—The market here continues inactive; not that there is an absence of inquiry, but because our manufacturers are refusing to meet competition. While \$2, 2¢ off for cash, is the ruling rate—some makers are refusing to sell under \$2.10—orders are being taken west of Pittsburgh at \$1.90. As stated in our report a few weeks ago, some of the mills at Wheeling and other points in the West are using Old Rails, thereby reducing the cost of production, but it is claimed that the quality of the Nails is not so good. So far as your correspondent is aware none of the Nail factories in Pittsburgh have as yet used any Old Rails, being apprehensive that it might injure the reputation of their Nails.

**Steel.**—There is a continued firm demand, and while orders are not coming forward as freely as they did last month, the mills generally have about all they can do; the consumption still appears to be on the increase, owing largely to its cheapness, which has caused it to supplant iron for many purposes as well as to almost stop the importation of foreign Steel. A few years ago it was difficult to get consumers to buy American Steel; they were prejudiced in favor of the foreign article and would use no other. In the course of time, however, owing to its cheapness, they were compelled to use the former in place of the latter, and the prejudice referred to has long since been removed, and foreign Steel in this country is a thing of the past. The Steel making capacity of Pittsburgh has been largely increased within a few years, yet it has been kept actively employed ever since the panic, while most other branches of business have been very much depressed.

**Rails.**—Steel Rails continue strong, but we make no change in our quotations, \$44, cash, at mill. Steel Rail Ends firm but unchanged at \$28, cash, at mill. Steel Billets and Steel Blooms firm at the advance noted in our report of last week, \$46 for the former and \$43 for the latter. Old Iron Rails continue in demand, with sales reported at \$22.50 @ \$23—sale of 1000 tons at \$23.

**Wrought Iron Pipe.**—The demand continues light for the season, with but little prospect of any immediate improvement. The fact of the matter is, business has been dull all this year. No change in discounts: 60 @ 65 on Water and Gas Pipe, and 40 on Boiler Tubes. Oil Well Casing and Tubing, net cash.

**Scrap.**—While business continues rather quiet prices are firmer, but unchanged. Dealers appear to be impressed with the belief that hard pan has certainly been reached, and there is no disposition manifested to make concessions in order to effect sales. No. 1 Wrought, \$20 per net ton; Boiler Scrap, \$14 @ \$15; Car Wheels, \$18 @ \$19, gross, Wrought Turnings, net, \$14 @ \$15; Cast Turnings, gross, \$10 @ \$11; Machinery Metal, \$14 @ \$15; Car Springs, \$31 @ \$32; Car Axles, \$26 @ \$27.

**Window Glass.**—This important branch of business is in a very unsatisfactory condition, with but little prospect of any immediate improvement. The market is open to all. There is no longer any association price; each individual or firm is allowed to meet competition and do just exactly as they please. The object, we presume, is to give those who are responsible for the low prices a benefit of the same. The consequence is that only about one-half of the factories here in Pittsburgh are in blast, notwithstanding it is usual for them all to start up about the 1st of September. We continue to quote discounts by the car load at 75 to 75 and 10.

## CHATTANOOGA.

*Yellow Fever, Business and Manufactures.*

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, Oct. 12, 1878.

Business here is, at last, utterly dead. The Vulcan Iron and Nail Works, the last of the large manufactories to succumb, closed down yesterday. The company will execute some needed repairs this week, and if they can get hands to begin and supplies are not too difficult to obtain, the manager will resume on the 21st. The Rising Fawn furnace has been kept in blast, the manager hauling his supplies for men and animals from Wauhatchie, the Alabama Great Southern Road having suspended on this end of the line some three weeks ago. It and Rockwood are the only establishments I know of in this district which have not been closed in consequence of the epidemic.

In the way of general business there is nothing at all doing, except by a few grocers, who keep open more for the public accommodation than for the sake of trade. There are not above 2,000 of our 12,000 remaining in town, and 200 of them are sick—so there are not many to trade with, and the few have little or no money.

There have been, since September 1, about 400 of our people treated for yellow fever, 84 of whom have died. Among the deaths are Dr. R. N. Barr. Dr. E. M. Baird is dying as I write—Sunday, 3 p. m. Dr. G. A. Baxter is recovering. Dr. Fraer has passed the crisis, and it is hoped he will pull through. Our expenses are now fully \$500 daily.

The weather during the first and middle of last week was frightfully bad for sick people, being wet and bleak and hot and close by turns. Friday and Saturday nights were very cool, with light frosts on the mountains. The middle of to-day was hot and sultry.

At the rate things are going it will be the middle of November before the wheels of industry are again fairly in motion. Meantime the suffering by poor workpeople is something which appalls the stoutest hearts to contemplate.

I appeal in behalf of these people especi-

ally to ironworkers in the Eastern and Middle States. They will certainly aid their fellow workmen who are in sore need. Especially is Chattanooga deserving of aid now, because when her sister cities in the Mississippi Valley were suffering from the scourge she threw her gates wide open and bid their people come and abide within them until they could return in safety to their homes. She did more. She contributed to Memphis, New Orleans and Vicksburg fully \$4000 in money and supplies. And now she pays the penalty of this generosity. Surely our friends throughout the country will not permit us to suffer needlessly when a little of their abundance will avert much or ameliorate more.

J. E. M.

## BOSTON.

OCT. 12.—Pig is without improvement. The business done continues to be in very small lots at a time. Nails have been in light demand, jobbing now at \$2.25 @ \$2.30. For 100-keg lots \$2.20 is the price. Sheet is selling at 3¢ @ 3¼¢ per lb. Russia is quiet at 10¼¢ @ 11¢. We quote English Spring Steel at 7¢ @ 8¢, gold; 9¢ @ 11¢ for German; 9¢ @ 11¢ for Machinery; 14¢ @ 15¢ for Cast; 10¢ @ 12¢ for Blister; 8¢ for American Spring; 13¼¢ @ 14¢ for Cast; 9¢ for Blister, and 8¢ for Machinery. In Plate Iron the only activity in this market is in Tank, which is selling steadily at 2¼¢. Boiler Plate is very dull, quoting 2¼¢ for No. 1 Charcoal, 2¼¢ for No. 1 Shell, and 3¼¢ for Flange. Merchant Bar jobs at \$1.70 @ \$1.75. The steamer Bulgarian, from Liverpool, brought 27 coils wire rope, H. L. Fearing & Co.; 6 cases steel and 39 bbls. hoops, Thayer & Lincoln; 6 coils wire rope, J. Nickerson & Co.; and 23 cases steel, order. The steamer Atlas, from Liverpool, brought 678 bars iron, Nightingale & Kilton; 61 bbls. steel, Joyce & Richardson; 240 pkgs. iron, J. B. Moors; 66 pkgs. steel, H. B. Jackson; 400 bbls. steel, Fuller, Dana & Fitts; 124 bbls. steel, order. The steamer Canopus, for Liverpool, took 2302 bars and 52 bbls. iron, G. W. Hunter & Co.; 33 cases and 8 bbls. steel, order. The steamer Oronto, from Hull, brought 10,771 bars iron, Jere. Abbott; 2234 coils wire rods, Naylor & Co. The steel rail mills report a continued improvement in the demand, and it is said that a sale of 10,000 tons has been made in the West on private terms. Copper is quiet at the close. The sale of 8,000,000 lb at 15½¢ for export has greatly relieved the market. For manufactures we quote: New Sheathing at 24¢ @ 26¢. The outside price rules in small transactions, but large buyers are purchasing at the inside figure. Bolts are quoted at 26¢ @ 28¢. Yellow Metal Sheathing continues very weak, quoting 12¼¢ @ 13¢ for English, and 13¢ @ 13¼¢ for American; Yellow Metal Bolts, 18¢ @ 20¢. Lead is dull. The visible supply is said to be 10,000 tons. We quote: Pig, 3½¢ @ 3¾¢, currency; Sheet, 5½¢; Pipe, 4¼¢; Tin-Lined Pipe, 12¢; Bar Lead, 4¼¢; all of these excepting Pig are subject to the usual trade or 10% discount. Antimony is firm and fairly active, and we quote 12¢ @ 12½¢. Spelter continues firm, with little disposition on the part of buyers to sell on the spot at less than 5¢ for 10-ton lots. Tin is weak and somewhat unsettled. The steamer Canopus, from Liverpool, brought 242 bxs. tin plates, J. B. Moors & Co.; 520 bxs. tin plates, order. The steamer Atlas, from Liverpool, brought 831 bxs. tin plates, order. The steamer Bulgarian, from Liverpool, brought 100 bxs. tin plates, Thayer & Lincoln. We quote: Straits, 13½¢ @ 13¾¢; Banca, 16½¢ @ 16¾¢; Refined English, 14¢ @ 14½¢, gold. We quote Plate: Charcoal, I. C., \$5.75 @ \$6; Coke, \$4.75 @ \$5; and Charcoal Terms, \$5.40 @ \$5.50, gold.—*Commercial Bulletin.*

## LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Oct. 13, write us as follows: There is a good demand for all grades of Pig Iron, and the market is firm at full figures. The usual time, 4 mos., is allowed on quotations below:

## FOUNDRY IRONS.

|  |       |                 |
|--|-------|-----------------|
| No. 1 Hanging Rock, Charcoal           | ..... | \$21.00 @ 22.00 |
| No. 2 "                                | ..... | 19.00 @ 20.00   |
| No. 1 Southern, Charcoal               | ..... | 18.00 @ 18.50   |
| No. 2 "                                | ..... | 16.50 @ 17.00   |
| No. 1 Hanging Rock, Stonecoal and Coke | ..... | 19.00 @ 20.00   |
| No. 2 Hanging Rock, Stonecoal and Coke | ..... | 18.00 @ 18.50   |
| No. 1 Southern, Stonecoal and Coke     | ..... | 18.50 @ 19.00   |
| No. 2 "                                | ..... | 17.00 @ 17.50   |
| "American Scotch"                      | ..... | 18.00 @ 19.00   |
| Silver Gray                            | ..... | 16.00 @ 17.00   |

## MILL IRONS.

|  |       |               |
|--|-------|---------------|
| No. 1 Charcoal, Cold-short and Neutral           | ..... | 16.00 @ 17.00 |
| No. 1 Stonecoal and Coke, Cold-short and Neutral | ..... | 16.00 @ 16.50 |
| No. 2 Stonecoal and Coke, Cold-short and Neutral | ..... | 15.00 @ 15.50 |
| No. 1 Missouri and Indiana Red-short             | ..... | 20.00 @ 21.00 |
| White and Mottled, Cold-short and Neutral        | ..... | 14.50 @ 15.00 |

## CAR WHEELS AND MALLEABLE IRONS.

|                                 |       |               |
|---------------------------------|-------|---------------|
| Hanging Rock, Cold-blast        | ..... | 29.00 @ 30.00 |
| Alabama and Georgia, Cold-blast | ..... | 28.00 @ 29.00 |
| Kentucky, Cold-blast            | ..... | 25.00 @ 26.00 |

W. B. BELKNAP & Co., Iron and Steel merchants, Louisville, Ky., under date of Oct. 14, write that the recent stiffening in Iron prices, noted in our last, has been responded to by a fuller run of orders than usual, showing that buyers begin to have faith in the future. There are no stocks either at mill or in jobbers' hands. It is difficult to say how much general trade is restricted by the fever and quarantines, but there can be no question that a large increase of business may be looked for soon. Low water and continued warm weather both operate seriously against us now, and further diminish the volume of trade. Prices may be quoted generally stiff with advancing tendency.

## CINCINNATI.

Messrs. E. L. HARPER & Co., under date of Oct. 12, write us as follows: The favorable condition noticed in our last report is maintained. A general feeling of improvement is noticeable not only among sellers, but among conservative consumers. Close buyers are now trying to place orders at prices which ten days since they would not consider. It is probably too late in the fall to realize any decided advance, but the market is getting upon a solid basis, and the opinion



expressed that bottom is touched is crystallized into an accepted fact. It is generally admitted that prices cannot be lower, and that if not now, then in the spring, after resumption has been accomplished (the bankrupt law being already out of the way) it is reasonable to expect an advance to at least the figures ruling nine or twelve months ago.

## HOT-BLAST FOUNDRY.

|                                    |               |
|------------------------------------|---------------|
| Hanging Rock C. C., No. 1          | 21.00 @ 22.00 |
| " " " " " " " "                    | 19.50 @ 20.50 |
| Alice, No. 1 Extra, 1. M.          | 21.00 @ 22.00 |
| " " " " " " " "                    | 20.00 @ 21.00 |
| " " " " " " " "                    | 19.50 @ 20.50 |
| Hanging Rock Coke and S. C., No. 1 | 17.00 @ 18.00 |
| " " " " " " " "                    | 16.00 @ 17.00 |
| Virginia Coke, No. 1               | 19.00 @ 20.00 |
| " " " " " " " "                    | 17.00 @ 18.00 |
| Shawnee S. C., No. 1               | 18.00 @ 19.00 |
| " " " " " " " "                    | 17.00 @ 18.00 |
| Hocking Valley S. C., No. 1        | 18.00 @ 19.00 |
| " " " " " " " "                    | 17.00 @ 18.00 |

## FOUR IRONS.

|                            |               |
|----------------------------|---------------|
| Hanging Rock, No. 1 C. C.  | 19.00 @ 20.50 |
| Hanging Rock, No. 2 Coke   | 16.50 @ 17.00 |
| Longdale, No. 1 Coke       | 17.00 @ 18.00 |
| Ala. and Tenn. No. 1 C. C. | 17.00 @ 18.00 |
| Red-short, No. 1 Coke      | 15.50 @ 16.50 |
| Cold-short, No. 1 Coke     | 15.50 @ 16.50 |
| Old Ralls, prime           | 18.00 @ 19.00 |

## CAR WHEELS AND MALLEABLE.

|                             |               |
|-----------------------------|---------------|
| Hanging Rock C. C.          | 30.00 @ 31.00 |
| Cherokee C. C.              | 28.00 @ 29.00 |
| Southern and Western Brands | 28.00 @ 30.00 |

## RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of Oct. 14: Market for nearly all descriptions of Iron fairly active at quotations:

|  |               |
|--|---------------|
| American Scotch Pig Iron                                       | 22.50 @ 23.50 |
| Anthracite, No. 1  | 18.00 @ 19.00 |
| " " " " " " " "  | 17.00 @ 18.00 |
| " " " " " " " "  | 16.00 @ 17.00 |
| Coke, No. 1  | 14.50 @ 15.50 |
| " " " " " " " "  | 13.50 @ 14.50 |
| Ya. Cold-blast Charcoal, Cold-short                            | 20.00 @ 21.00 |
| " " " " " " " "  | 19.00 @ 20.00 |
| Ya. Warm-blast " " " "   | 18.00 @ 19.00 |
| Ya. " " " " " " " "  | 17.00 @ 18.00 |
| Old Ralls  | 16.50 @ 17.50 |
| Wrought Scrap No. 1  | 16.00 @ 17.00 |
| Cash   | 15.00 @ 16.00 |
| Richmond Refined Bar Iron                                      | 20.00 @ 21.00 |
| Horse Shoes per keg  | 4.00 @ 4.50   |
| Mule   | 5.00 @ 5.50   |
| Old Dominion Nails, Standard Size, 1/2 keg                     | 3.25 @ 3.50   |
| Freights to Philadelphia, \$1.40 per ton of 2400 lbs., by rail |               |
| Freights to New York, \$1.60 per ton of 2400 lbs., by rail     |               |

## BALTIMORE.

Mr. W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following prices, under date of Oct. 14: Improved feeling is noticeable in this market for the past week. Prices are evidently hardening, with light stocks in dealers' hands.

|   |             |
|---|-------------|
| Refined Bar Iron, 1 to 6 wide by 3/4 to 1 thick | 1.85 @ 2.00 |
| Refined Bar Iron, 1 to 4 wide by 3/4 to 1 thick | 1.85 @ 2.00 |
| Refined Bar Iron, 1/2 to 3, Round and Square    | 1.85 @ 2.00 |
| Hoop Iron, 1 1/2 wide and upward                | 2.00 @ 2.25 |
| Band Iron, from 1 1/4 to 4 in. wide             | 2.00 @ 2.25 |
| Horse-shoe Iron                                 | 3.00 @ 3.50 |
| Norway Nail Rods                                | 3.00 @ 3.50 |
| Black Diamond Cast Steel                        | 4.00 @ 4.50 |
| Squares and Octagons, ordinary sizes            | 13 @ 14     |
| Machinery Steel                                 | 8 @ 10      |
| Cast Spring Steel                               | 6 @ 8       |
| Homogeneous Steel Plates                        | 7 @ 9       |
| Common Horse Nails                              | 13 @ 16     |
| R. R. Spikes, 5 1/2 x 16                        | 2.50 @ 2.75 |
| Perkins' Horse shoes, 1/2 keg of 10 lbs.        | 3.60 @ 3.75 |
| Mule shoes                                      | 4.00 @ 4.50 |
| Putnam Horse Nails                              | 18 @ 20     |
| Globe Horse Nails                               | 18 @ 20     |
| Less list discount to the trade                 |             |

Messrs. R. C. HOFFMAN & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of Oct. 14: The demand for iron continues fair and prices well maintained at about fair rates, viz.:

|                        |               |
|------------------------|---------------|
| Baltimore Charcoal Pig | 26.00 @ 28.00 |
| Virginia               | 26.00 @ 28.00 |
| Anthracite No. 1       | 19.00 @ 20.00 |
| " " " " " " " "        | 18.00 @ 19.00 |
| " " " " " " " "        | 17.00 @ 18.00 |
| " " " " " " " "        | 16.00 @ 17.00 |
| Charcoal, C. B. Blooms | 30.00 @ 32.00 |
| " " " " " " " "        | 28.00 @ 30.00 |
| Refined Blooms         | 43.00 @ 45.00 |

## FOREIGN.

## FRANCE.

(Monteur des Interests Matériaux.)

PARIS, Sept. 29, 1878.—*Metals*.—Advices from various industrial districts of France are a little better; orders are more frequent, and it seems that the fall campaign is setting in in good earnest. Copper is sustained at the recent improvement. We quote first brands Chili Bars, 161.25; Common ditto, 150; Ingots and Slabs, 150; Selected English, 170, and pure Corocoro Ore, 167.50. Havre remains steady, and quotations as follows: First brands Chili Bars, 165; good current ditto, 162.50, and Lotte and Urmetta, 160 francs the 100 kilos. Paris conditions. Marseilles is firm. They quote Spanish, in slabs, 152.50; Red Tokat, 160; small Refined Ingots, 172.50; Sheathing, 187.50; Bolts, 192.50, and other Metal Sheathing, 185. 2 1/2 in. remains weak as ever here and elsewhere. We quote Banca, 170; Billiton, 161.25; Straits and Australian, 157.50, and English, 160. Marseilles has been tolerably well sustained. They quote Banca, 165; Straits, 157.50; Billiton, 155, and English Refined, 170. Lead is slightly firmer. We quote the various sorts, deliverable at Havre, 41, and here, 41.50 francs the 100 kilos. Havre remains steady at 41. Marseilles is inactive. They quote First Fusion, soft, 39; Second Fusion, 38.75 @ 39, and Sheet, Pipe and Shot, 44. Spelter is less weak than it has been. We quote Silesian, deliverable at Havre, 47; other good brands, 47, and at Paris, 47.50. Marseilles is inactive. They quote Vieille Montagne Sheet Zinc, 58; Southern, 56, and Old Remelmed, in slabs, 42.50. This is hardly the season for Spelter to improve, the winter demand generally being slack, but on the other hand stocks are comparatively light, and speculation may take charge of them. Iron.—Not much change can be reported in the general aspect. At Paris business is in the iron district for Paris and the provinces. Very little is done there in iron wire and chains. There is some inquiry, however, for Sheets for architectural purposes. Some business has been transacted in the region at weaker rates. Some Nails are being shipped on export orders. The North is in a rather improved position now that the low price of Merchant Iron of between 150 and 155 francs begins to attract attention. The works of this region are now better able to compete against the St. Etienne group in their dealings with Western France, the freight by coasters being very low. In the Moulins-de-Moselle the real price at which affluage Pig Iron is being sold is 58 francs. Pig Iron for castings, No. 3, sold at 72 francs. Coal.—The outlook, taken as a whole in France, is not encouraging. A fair demand has sprung up for Coal for domestic consumption. The manufacturers of France still hold back, and seem determined to go on operating yet a while from hand to mouth. Prices are tolerably steady.

## BELGIUM.

(Revue Universelle.)

BRUSSELS, Sept. 29, 1878.—*Iron*.—The 54 locomotives alluded to by us in former reviews have been adjudicated, seven Belgian locomotive builders furnishing them to the State. The price, according to description, has ranged between 41,000 and 61,000 francs. The Bascoque (Chapelle) Coal Co. has ordered from the Haume Works and the Belgian Metallurgical Co. 45 hopper coal freight cars. In spite of the national holiday week there was an unusually numerous attendance on "Change," but we do not hear that much business has been transacted. A new automatic car coupling has been introduced and will be put to the test on an extensive scale on our government railroad lines—we mean the Penny coupling, the invention of Messrs. E. Penny and V. Mabilie, of Mariemont. The coupling of cars by hand has been the source of continual accidents in Belgium and elsewhere, and many new contrivances have been devised, all more or less defective or imperfect. Perhaps this new system will answer all purposes. It may be seen in the Belgian section of the Paris Exhibition. One-third of the 282 railway hands killed and wounded on the Belgian railroad lines in 1876 met with accidents through coupling the cars by hand. A dispute has arisen between Messrs. Jules Van der Laet & Co. of this city, and a Calcutta correspondent of the London Mining Journal about the output in weight of certain shipments of Belgian Bar Iron to the East. According to the said correspondent, Belgian iron masters have only, through cheating in the weight, been able to secure the monopoly in the trade in common Bar Iron in India and China. The Belgian firm refutes this accusation by producing the figures of the output at the Hong Kong, Shanghai and Yokohama, the difference in weight showing a deficiency of but 2 per mille to 1, and on this basis he calls in doubt the veracity of the statement of a shortcoming of 3 at Calcutta. The market becomes quite lively on the approach of the cold season.

## GERMANY.

(Borsen-Halle.)

HAMBURG, Sept. 28, 1878.—*Metals*.—Business in general and metals in particular still leaves a great deal to be wished for in Germany. In the trial matters are reviving very slowly among us, and the same is the case in neighboring countries. Germany and the surrounding nations of Western Europe are witnessing a growing excess of imports over exports—our own at the rate of about 400,000,000 per annum, and this state of affairs begins to cause serious alarm among statesmen, economists and merchants. Copper has been remarkably quiet, but no further giving way can be reported. There is no change either here or at Stuttgart. Berlin quotes English and Australian 67 @ 72 marks the 50 kilos., and Mansfield 72 @ 75. 2 1/2 in. —Our markets are decidedly weak, although as yet unaltered so far as quotations are concerned here and at Stuttgart. Berlin quotes Banca 69 @ 69.50 marks the 50 kilos., and English Refined 66 @ 66.50. Lead forms an exception, and is much firmer. No change can be reported either from Siedem or from here. Berlin quotes Tarnowitz, Hartz and Saxonian 17 @ 17.50 marks the 50 kilos. Spelter.—Our markets are inactive. At Breslau the Krasmira brand has been sold at 17.25 marks the 50 kilos. Hamburg and Stuttgart remain unchanged. Berlin quotes good brands Silesian 18.25 @ 19 marks the 50 kilos.

## HOLLAND.

(Koch &amp; Vlierboom.)

ROTTERDAM, Oct. 1, 1878.—*Tin*.—On the 25th ult. the Rotterdam Trading Society sold in this city at public auction 24,172 slabs Banca Tin at an average price of 35.80 guilders the 50 kilos. Since then Banca has sold at 36, and subsequently at 35.75 guilders, and Billiton at 34.50. The stock on warehouse with the Rotterdam Trading Society on 25th inst. was 44,411 slabs Banca and 5105 Billiton, against 71,008 Banca and 10,761 Billiton in 1877. The deliveries since January 1 have been 87,206 slabs Banca and 2954 Billiton, against 101,106 Banca and 2200 Billiton in 1877. There are 4000 tons on board of sailing vessels 400 piculs, against 300 piculs a year ago. The deliveries of Billiton Tin from private hands have been 7974 slabs in September and 63,000 slabs in October, while the present stock of Billiton here and at Amsterdam is 48,719 slabs.

## Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., Oct. 1, 1878.

TRADE NEWS  
is scarce, indeed the makers of industrial bricks are nowadays occasionally put to dire straits by lack of the necessary straw. It may do now and then to state the excessively plain fact that "there is nothing doing," but in course of time people begin to look for a little novelty and grow weary of that iteration which the late Mr. William Shakespeare so heartily condemned by the mouth of one of his creations. Thus when I say that

## THERE IS NOTHING NEW

I do, in some respects, speak the truth (which your readers will doubtless admit to be a capital thing now and then), but in others I hardly place the square facts of our leading industries before you. Even in the great depression which still reigns supreme throughout our iron and coal districts there is a certain amount of fluctuation which deserves to be chronicled, and a sort of dumb pathos which must have vent as representing the desperate inward struggles now going on.

## THE TRUTH.

the plain truth, and nothing but the truth is that things are very bad over here. No worse perhaps in individual instances than on your side of the Atlantic, but probably duller in the aggregate, even as the magnitude of the interests affected are so much the vaster here than in the United States.

## ON THE CONTINENT

the current state of affairs is not one whit better, nor do the most recent accounts seem to hold out the existence of anything which points to a forthcoming improvement. In Belgium the bar iron, nail rod and girder houses are only moderately well employed, much of their business being on export account and transacted through English merchants here. The worthy Belgians, however, have lately fallen into no little discredit, owing to sundry—no doubt accidental—commitments found to be a good deal below invoiced weights on arriving at their respective destinations. Their prices are so low, nevertheless, that I do not suppose their general connection will be largely affected in consequence. In Germany business is reported slack, and from France we hear an almost unanimous groan about the terribly low prices and the unrelieved apathy of the market. The Austrian and Hungarian works are apparently well engaged, as are the Russian establishments, but there is much reason for supposing that profits are pretty nearly nil. Thus far the producing centers.

## FROM THE CONSUMING MARKETS

all over the world our most recent advices are only of moderate tone—overstocking and the incessant operation of the (as I think) vicious consignment system having a constant tendency to keep down prices and to

render any likelihood of a recovery very remote. This is particularly the case with our own colonies, and even more especially so in Australia, New Zealand and Fiji, where we meet your exporters on what is palpably debatable ground. Our accounts from the antipodes all express a decided opinion that stocks are too heavy, and that importers have too much on their hands to turn their goods over to advantage.

## THE REMEDY

is anything but easy—indeed I confess I cannot see where it "comes in" or in what manner it could be best applied. The colonies and South America are, metaphorically speaking, slaughter houses both for yourselves and ourselves. Thither the overplus of manufactures is sent, and there is nothing at it but that they shall sell for what they will fetch. Superficially it would seem that our colonial friends benefit by this sort of thing, but in reality the extent of their participation is not large, for whatever they may gain in quantity there is not much doubt they lose in quality. Where cheapness is the only desideratum it is evident that nothing but that qualification is kept in view, and it is not now less clear than at any former period of the world's history that a good article can only be obtained by paying for it. Leaving the far-off antipodes and

## TURNING TO CYPRUS

for a moment, I feel bound to give it in as my opinion that there is a good deal of "dodging" in progress as to that latest British acquisition. Those enterprising persons or firms who took time by the forelock and launched their enterprises almost before the British flag was unfurled have sent home doleful accounts of the island and its alleged miserable resources; but my own impression is that they are merely doing so in order to minimize competition and so keep the virgin field for their own working. I have seen letters from the island in which the writers say they "have been in much worse places," that "they are doing pretty well," and that "there is a good opening for such and such goods." I also notice that the solitary newspaper there mentions the establishment of a Birmingham hardware house, and I know that certain London houses have sold mineral water machinery, iron huts, filters, &c., in considerable quantities.

## OUR INDIAN NEWS

is certainly discouraging for the time being, but the more sanguine among us think that the Cabul difficulty is to a great extent a bugbear. There is no doubt that Russia is the instigator of the Amer, but well-informed people are decidedly of opinion that finances at St. Petersburg are so low that the Czar's government are in no condition to risk a full encounter with England just now. At all events a good silver exchange would seem to be all that is wanted to give a sound fillip to our commerce with India. Coming home again, I note that

## IN SCOTLAND

the pig iron market is quiet, and in many respects has been flat since the date of my last letter, although James Watson & Co. report a large business doing in warrants at about 46 7/8, cash. Shipping business is still slow, however, the total decline this year to date having been 51,720 tons, although the increased importation from Middlesborough into the Scotch ports has been 6668 tons on a total this year of 216,983 tons. This being the fact it becomes a problem as to what the

## SCOTCH PRODUCERS ARE TO DO.

They have confessedly almost lost the United States market—once a large buyer of all their best grades—and not only so, but are purchasing for their own use immense quantities of an article once thought to be so inferior as not to be mentionable on the same day of the week as their own brands. Their production continues, nevertheless, but their stocks grow without ceasing and they have no new outlet for their produce. This being so their condition must be precarious, and it is no matter for much surprise to hear, as we have done here during the week, rather pertinent whispers as to the credit of one large concern whose fate is rumored to be intimately allied with that of a Scotch banking concern.

## THE QUARTERLY RETURN

of Mr. Waterhouse, the sworn accountant of the Northern Ironmasters' Association, just issued, has come at an opportune moment. It shows a reduction in the output of angles, bars, plates and rails of nearly 12,000 tons during the three months, the total production of all kinds having been about 103,000 tons. Not only have the totals made been lower, but selling prices have declined 3/6 per ton on the average, a circumstance which may lead the ironmasters to seek a further drop in wages.

## AT SHEFFIELD

affairs are in pretty much the same condition as heretofore. The iron and steel industries are unaltered in the main—the iron works being badly off for orders, and the Bessemer establishments pretty well engaged. In steel wire the business doing is about an average. A friend who is himself in the electroplate trade tells me that he thinks there is a little better tone, and certainly rather more work in hand. Martin, Hall & Co. are doing well in the home market and in Australia, but their agent there is ill and coming home for a time. His place is being occupied meantime by a Mr. Cowlshaw. Dixon & Sons are said to be dull as regards hollow-ware, but are busy for India on spoons, forks, &c. One house is producing a new folding biscuit box in large quantities, and another is doing well in its specialty percolators. Yet another is prospering in France, albeit the firm abstained from exhibiting at Paris!

## FROM STAFFORDSHIRE &amp; BIRMINGHAM

current tidings are meager—the "no news" being anything but "good news" in this case. Iron is quiet, and the iron masters are again seeking to lower their men's wages, in proportion to the £1 drop in marked bars. The hardware manufacturers are for the most part moderately busy. The tin and hollow-ware trade have held their quarterly meeting, and have decided not to make any alteration in discounts for the next three months.

## IN SOUTH WALES

iron and steel are in but moderate request and exports are slow. The great event of the week has been the renewed pact of the tin-plate manufacturers, who met at Swansea on Thursday and determined to limit the output one-fourth for the next twelve months under a penalty of £500. This time they look like meaning business, and have appointed an inspector (Mr. Magrath) to see the agreement properly carried out. During the week the creditors of a tin-plate "operator," Mr. Hall of Liverpool, have met and have given vent to a good deal of apparently righteous indignation against the manner in which he has obtained goods and disposed of them. At the same time I have no doubt they are all quite as much to blame as he. They were certainly anxious enough to sell at all events.

## THE METAL MARKETS

have been moderately steady. I make the following extracts from the monthly circular of Messrs. Sanders Brothers, London:

## COPPER.

Our present quotations are:

|                            |         |         |
|----------------------------|---------|---------|
| Ores and regulus, per unit | £ s. d. | £ s. d. |
| Chili bars, per ton        | 60 0 0  | 61 0 0  |
| English tough, per ton     | 60 0 0  | 61 0 0  |
| " selected, per ton        | 67 0 0  | 68 0 0  |
| " manufactured, per ton    | 71 0 0  | 72 0 0  |

Compared with same date 1877:

|                            |         |         |
|----------------------------|---------|---------|
| Ores and regulus, per unit | £ s. d. | £ s. d. |
| Chili bars, per ton        | 60 0 0  | 61 0 0  |
| English tough, per ton     | 60 0 0  | 61 0 0  |
| " selected, per ton        | 74 0 0  | 75 0 0  |
| " manufactured, per ton    | 77 0 0  | 78 0 0  |
| Month ended Aug. 31        |         |         |
| Exports to U. S. unmd.     | 1876    | 1877    |
| " other countries          | 18,540  | 17,978  |
| " U. S. manuf'd.           | 40      | 58      |
| " other countries          | 18,800  | 18,378  |
| Month ended Aug. 31        |         |         |
| Exports to U. S. unmd.     | 30      | 100     |
| " other countries 156,123  | 138,381 | 163,451 |
| " U. S. manuf'd.           | 230     | 921     |
| " other countries 140,388  | 150,537 | 153,760 |

The dull state of the copper market continues; prices are lower all round, consumers seem to be in worse heart than ever, and continue to buy only for absolute wants or to cover fresh orders, which come slowly. The demand consequent upon war and warlike preparations has ceased, and as yet no general improved business takes its place, so we find total stocks again slightly increased, the figures being on Sept. 1, 49,931 tons, against 49,894 tons on Aug. 1, with unfortunately almost a certainty of a further increase at the end of the current month, charters for the second half of August having been 4000 tons, and for the first half of this month 2200 tons, with only moderate deliveries. These continually increasing figures, however explanations may be found for them, slowly drag prices downward. Manufactured copper has been in only moderate demand, India still buying very sparingly, and with a prospect of frontier troubles there, consignments will probably be further curtailed. Australian copper is in very moderate demand at £6 for Wallowa and £68 for Burra, other sorts being in fair supply at £2 @ £4 less, according to brands and quality.

## SPIEGELEISEN.

We quote for 20 c English, £4. 17/6 3/4 ton, f. o. b. Makers are well supplied with orders for early delivery, buyers also seeming satisfied. Market is steadily quiet.

## FERROMANGANESE

unchanged in price, with slow demand, but no disposition to reduce limits.

## LEAD.

Our present quotations are:

|                      |         |        |
|----------------------|---------|--------|
| WB..... per ton      | 18 0 0  | 19 0 0 |
| LB.....              | 16 10 0 | 17 0 0 |
| Ordinary brands..... | 16 2 6  | 17 0 0 |

Compared with same date 1877:

|  |         |         |
|--|---------|---------|
| WB..... per ton  | 20 15 0 | 21 0 0  |
| LB.....  | 20 5 0  | 20 10 0 |
| Ordinary brands.....   | 20 0 0  | 20 0 0  |
| Month ended Aug. 31  |         |         |
| Exp'ts to United States, tons  | 1876    | 1877    |
| " other countries  | 3,965   | 4,443   |
| Month ended Aug. 31  |         |         |
| Exp'ts to United States, tons  | 1,007   | 1,877   |
| " other countries  | 23,270  | 25,694  |
| Lead has had a further fall. Arrivals of foreign continue heavy. Home trade is dull, and apparently the bottom has not been reached yet. |         |         |

## REGULUS OF ANTIMONY.

£49, compared with same date last year £48 @ £49. Amount of business doing is very small, and the article remains without particular feature.

## TIN.

|                                   |         |                |
|-----------------------------------|---------|----------------|
| Our quotations to-day are:        |         |                |
| Quotations to-day                 | £ s. d. | Same date 1877 |
| English L. & F. Ingots, per ton   | 61 00 0 | 60 00 0        |
| " Bars in Barrels                 | 60 00 0 | 60 00 0        |
| " Refined                         | 60 00 0 | 60 00 0        |
| Straits                           | 58 00 0 | 55 00 0        |
| Australian                        | 56 00 0 | 54 00 0        |
| Month ended Aug. 31               |         |                |
| Exports to United States.....cwt. | 1876    | 1877           |
| " other countries                 | 3,321   | 3,608          |
| Month ended Aug. 31               |         |                |
| Exports to United States.....cwt. | 8,234   | 21,061         |
| " other countries                 | 61,110  | 59,750         |
| Month ended Aug. 31               |         |                |
| Cwts.....                         | 33,961  | 33,022         |
| Month ended Aug. 31               |         |                |
| Cwts.....                         | 228,266 | 215,447        |

The statistical position of tin is not very much altered, as will be observed on reference to our figures below. Arrivals of Australian keep heavy, the coast shipments being cable as 1100 tons, and holders, perhaps partially through dearer money, have lost heart and press sales. The consequence has been a sharp fall to £56, at which we close with a weak market and many prognostications of still further reductions in prices. The last Dutch Trading Company's sale on the 24th instant realized an average price equal to about £60. 5/4, laid down here, which will be noticed to be a fall of £6. 5/4 since the sale on the 31st of July. Comment on the position of the market is needless.

Whatever the price is there is always enough tin offering for all consumptive requirements and a stock over at the end of the month to increase the total, and it is little wonder that speculators are getting more and more sick of the article. English has fallen in sympathy, though not quite to the same extent, sales not being so pressed. The demand is light. The following statement shows the present position of tin:

|                                     | July 1, | Aug. 1, | Sept. 1, |
|-------------------------------------|---------|---------|----------|
|                                     | 1878.   | 1878.   | 1878.    |
| Tons.                               | Tons.   | Tons.   | Tons.    |
| Foreign Tin in London .....         | 9,470   | 10,070  | 10,111   |
| Banca and Billiton in Holland ..... | 2,749   | 3,147   | 2,883    |
| Stocks .....                        | 12,219  | 13,217  | 13,994   |
| Banca in hands of the Dutch .....   |         |         |          |
| Trading Co. unsold .....            | 613     | 902     | 1,253    |
| Foreign Tin afloat for Europe ..... | 4,410   | 3,550   | 3,130    |
| Total .....                         | 17,242  | 17,669  | 17,872   |



## INDUSTRIAL ITEMS.

## MASSACHUSETTS.

A letter from Paris, bearing date of Sept. 1st, says: The Globe Nail Co., of Boston, have received for their superior horse-shoe nail, from two different committees of the Paris Exposition, two gold medals, being the highest award and the only gold medals ever given for that class of goods since the creation of the globe itself. A great triumph, this, for the superior skill and ingenuity of American mechanics, as well as a full and complete recognition of the untiring efforts of the company to perfect their enterprise. The awards granted by the two different committees, composed as they were of the leading business and mechanical minds of the various nationalities of Europe and of America, is additional proof of the undeniable fact that no nail in the world can excel or equal them. If any other proof were wanting it would be found in the simple fact that at every other world's, national, State, county and town fair where these nails have been exhibited they have always been given the highest award.

The Fitchburg Steam Engine Co. received an order for a 10-inch cylinder engine, rated 20-horse power, on the 21st of September. They began preparing material Sept. 24 and had the engine completed and ready for shipping Oct. 2, just 11 days from receipt of order. Every ounce of stock had to be ordered, 11 men only were employed on the job and there were no charges for overtime.

The works of the United States Cartridge Company, Lowell, which have been run night and day a good portion of the time for the past year, are now running regular hours only.

The Gaylord Mfg. Co. are building a three-story brick addition to their sword shop to obtain increased facilities in sword manufacture, and business with them is very fair.

## CONNECTICUT.

The Hartford Spring and Axle Co. have been incorporated at Norfolk with a capital stock of \$15,000, divided into 600 shares of \$25 each.

Messrs. Beecher & Peck, New Haven, are building two drop presses for the manufacture of steel and silver spoons. They have just received an order from the Western Lock Co., Geneva, Ohio, for drop presses to be used in their works. This is, we believe, the second order the firm have received from this company.

## NEW YORK.

The steel works are in full operation, with enough orders ahead to insure their activity for a long time to come. This will be gratifying intelligence to the employees who depend upon their daily labor for a livelihood. —Troy Times.

Messrs. Meenly & Kimberly, of Troy, received an order last week for a bell for a mission church in the interior of Africa. The order states that this will be the first bell in that portion of Africa.

From Buffalo we learn that parties are preparing to start up the old Union Iron Works of that city.

## PENNSYLVANIA.

The Dickinson Manufacturing Company, of Wilkesbarre and Scranton, Pa., have recently taken a contract to build three large blowing engines for the steel works of the Lackawanna Iron and Coal Company. The steam cylinders will be 60 and the blowing cylinders 80 inches diameter.

The demand for the Sheridan Furnace iron, says the Philadelphia North American, has compelled Wm. M. Kaufman & Co. to blow in their second furnace.

We clip the following from the Sharon Herald of the 11th inst.: For the week ending Oct. 5, in Sharon, at Westernman's Iron Works, puddle, guide, hoop and sheet mill double turn, bar mill single turn, nail plate mill, nail factory and both spike machines on. Chain factory running the greater part of the fires. Blast furnace No. 2 doing well; this is her forty-first month, and she appears good until spring. Nothing doing yet at No. 1. At the Stewart Iron Works some of the good signs are becoming actually existing fact. There is not a ton of No. 1 or No. 2 iron in the yard, and what is now making is put on the cars ready for shipment out of the pig bed while the iron is yet hot. A few small lots of mill iron are still there, but "not for sale at Pittsburgh rates," was the answer given to our inquiry as to its probable future. A few improvements are talked of, but the talk is of such a kind as to be set down as fact. They propose tearing down the battery of "root boilers" now in use there, and putting in their stead four 50-foot cylinders, putting up another blast engine of the "Globe Works" pattern, and fitting up, and blowing in furnace No. 2, just as quick as circumstances will admit of. That's the way to do it; now just put the mill in operation and we will take a new hat of your buying. In West Middlesex, the mill is running seven furnaces six heats a day and likely to put another furnace on soon. The Fanny Furnace running up close to 40 tons a day Bessemer.

The Hazard Manufacturing Company's wire mill, in this borough, says the Mauch Chunk Democrat, is running on full time, and the prospects are good for a continuation of this property for some time to come. In the past two weeks Mr. Reichard received orders for nearly 70,000 pounds of wire.

One of the Spearman Furnaces at Sharpville has blown in. A considerable amount of its product has been sold ahead.

The Phoenixville Bridge Works have secured another contract from the Canadian Government Railroad, known as the Montreal, Quebec, Ottawa and Occidental Railway, and will build eight iron bridges in all, as follows: One of a 220 feet span over the Ottawa River; four of 150 feet span; two of 100 feet each, and one of 80 feet. They are all to be completed between the date of contract and the middle of December. The order was received on the 26th of September, and the railroad company want the bridges delivered before navigation closes. The Phoenixville Company have just finished a bridge over the Tombigbee River at Columbus, Miss., consisting of a span of 210 feet with a draw, and one span of 180 feet and one of 70 feet, both fixed spans, for the Mobile and Ohio Railroad.

The puddling furnaces of the Philadelphia Iron and Steel Works were started on Wednesday of last week, a sufficient number of men having been secured. This is the only establishment affected by the Kensington strike that is in operation.

Messrs. Cole & Halman, boiler makers, Allentown, have just been awarded the contract to build two large boilers for a party in New York. The boilers are to be 7 feet high and 20 feet long, with a fire-box 6 feet square. They also have received the contract to erect a large gas factory in the State of Vermont.

The Altoona Iron Company will probably put up another guide mill for the exclusive manufacture of hoops.

Adam Miller, of Harford, has purchased letters patent of a newly-invented horse hay rake, in which the power for dumping may be taken simultaneously from the periphery of both wheels or from either one independently of the other. No ratchet wheels are used. There is no tangential strain at the hubs. The device can be applied to defective rakes of other design at a nominal cost.

## PITTSBURGH AND VICINITY.

The sales of pig metal in this city last week were larger than for a corresponding time for some months, aggregating 4610 tons of bituminous smelted irons and 580 of anthracite.

The entire department of the Pittsburgh Forge and Iron Company's Works in Allegheny City is working double time.

The use of natural gas has been discontinued at the Millvale Mill of Graft, Bennett & Co., and the furnaces are now running on coal.

Marshall Brothers have been awarded the contract for steam elevators and inclined plane machinery for the new warehouse of the Hemingray Glass Company, Cincinnati, Ohio.

The new electric switch of the Pennsylvania Railroad at East Liberty is now nearly completed. The machinery for turning the switches east and west for a considerable distance is in position, and the framework of the tower house inclosing it is being erected.

It is expected that the entire grading of the Pittsburgh Southern Railway will be completed by the 15th inst., and that cars will be running through from Pittsburgh to Washington by the 10th of November.

Lindsey & McCutcheon's mill, Allegheny, has all it can do. One turn on the 10-inch mill has been stopped because the puddlers cannot finish muck iron rapidly enough to keep it running.

Robinson, Rea & Co., Pittsburgh, have constructed a fire-proof building near their works, which will be used as a depository for patterns.

Mackintosh, Hemphill & Co., Pittsburgh, are just completing a blast engine for the Cambria Iron Company, Johnstown, for a furnace that has been out of blast for some time; a universal mill for rolling bridge links for Mr. A. Kroman, of the Superior Works, and have just put up a 4-ton steam hammer at the Keystone Bridge Works.

The Edgar Thomson Steel Co., Limited, are about to build at their works at Bradfield three new blast furnaces. They have purchased the Escanaba (Michigan) furnace and will remove it to their works. It will be blown in on pig iron at first, but it is expected afterward to make spiegel in it. The furnace is a 13-foot bosh, but can be lined out to a 14-foot bosh. It is one of the best charcoal furnaces ever built, having all the modern improvements. The furnaces will cost about \$300,000 and will give employment to several hundred men in addition to those already employed at these works.

Messrs. Anderson & Passavant are enlarging their wire mill on Second avenue, Pittsburgh. A Siemens's furnace is being constructed the foundation of which has already been commenced.

## MARYLAND.

The Baltimore and Ohio Rolling Mill at Cumberland will be started in operation again this week, with Mr. Wm. Robinson of Baltimore as superintendent. Mr. Robinson formerly had charge of the establishment of Trego, Thompson & Co., of Baltimore.

## OHIO.

The reported leasing of the Union Iron Mill by the Cleveland Rolling Mill Co. arose from the fact that they have leased conditionally a portion of the Etna Mill of the Union Works, and will experiment on the manufacture of steel hoops.

On the afternoon of the 7th inst. the first sheet of plate iron that has been made for five years was made at the Old Mill at Niles, Mrs. James Ward, Sr., quite an elderly lady, applying the steam that set in motion the ponderous old rusty wheel that for five years past has been of no service.

The Sandusky Tool Works have within the past summer been increased by the addition of another story upon the main building, affording a room 50 by 150 feet for a workshop. The works are now running full time, employing 120 hands. The company have recently commenced the manufacture of hoes of various shapes. This branch will be made one of their specialties.

The nail mill of the Belfont Iron Company at Ironton is running full time.

There is a better feeling in the iron market. Some of the furnaces have sold ahead of production. —Ironton Register.

The Washington Furnace is making about 12 tons of stonecoal iron per day. The Ironton Register says: Belfont Furnace will have its hoisting apparatus completed soon. Then, when 300,000 bushels of coke arrives from Pittsburgh, the furnace will go into blast under the management of James Bird. The coke will come as soon as the river rises. Mr. Haughton, the former manager, has accepted a position at the Ashland Furnace.

The Cleveland Screw and Tap Company, Elyria, are running full time and are full of orders. They recently received two orders amounting to 125,000 screws.

Messrs. Barney & Kilby, proprietors of the Fulton Machine and Foundry Works at Sandusky, are running full time, employing about 60 men. They have lately received some very large orders, among which are one 125-horse-power engine, two engines with boilers complete of 30-horse power; one 40 and one 50-horse engine, with boilers

and fixtures complete, besides three or four flouring mills.

## ILLINOIS.

Messrs. Payson & Co., Chicago, Ill., are running their hardware factory on full time. They are making the "Perfect Sash Lock," and window and blind trimmings. On the sash locks they have increased their capacity so that they can now turn out 2500 per day.

## TENNESSEE.

The managers of the Southern States Coal, Iron and Land Company, South Pittsburgh, are pushing construction as fast as possible. The shells for two 20 feet bosh furnaces, with the hoisting machinery, blast engines and Whitwell stoves are completed. Mr. Pechin, the manager of the construction, expects to blow one furnace in next March. This company has just contracted to erect several of Stutz's coal-washing machines at their mine at Victoria, where they have already built a number of coke ovens. Work has been commenced, and the washer will be running in about two months.

The Roane Iron Co., Chattanooga, are making iron at \$9.45 per ton at the Rockwood furnace. The coke used is made by the company, and is the hardest and closest coke made in the Southern States, but contains a great amount of ash. To reduce the percentage of impurities to a minimum, the company have decided to put up one of Stutz's coal-washing machines, and Mr. C. Constable, the superintendent of the furnace, expects to make iron below \$9 per ton as soon as he can have a better fuel. The washer will be ready in about six weeks.

## MINING ITEMS.

## COAL.

Charles Armstrong & Son are going to add 18 or 20 more coke ovens to the 40 already in operation at Pittsburgh, Pa.

The Allentown (Pa.) Iron Company ceased operations some days ago in about 20 of their mines throughout Whitehills and Macungies. Work will be resumed in about three weeks.

The Bureau of Statistics gives the following imports and exports of coal for the seven months ended July 31st:

|                          | Tons, 1878. | Tons, 1877. |
|--------------------------|-------------|-------------|
| Imports, bituminous..... | 302,116     | 200,672     |
| Exports, bituminous..... | 178,384     | 180,729     |
| Anthracite.....          | 168,161     | 218,083     |

In September Honey Brook and Trescow worked 8 days; Yorktown, 7; Beaver Brook, 9; Jeausville, 10, at one mine, 7 at another (9 hours shifts), and Coleraine about 9 days at one breaker only. Some of the collieries are idle at present for want of water. —Hazelton Sentinel.

The coke works at Scottsdale, Pa., are all in operation.

The coal tonnage over the Reading Railroad and branches for the week ending Saturday, October 5, 1878, compared with the corresponding week last year, is as follows:

|                              | Week.        | Year.        |
|------------------------------|--------------|--------------|
| Passing over Main Line and   |              |              |
| Leb. Val. Branch.....        | 115,078.19   | 117,104.06   |
| For shipment by Schuylkill   |              |              |
| Canal.....                   | 25,626.19    | 23,565.04    |
| Shipped west via Cat. and    |              |              |
| Wpt. Br. & N. C. R. R.....   | 7,996.15     | 13,838.17    |
| Shipped West and South       |              |              |
| from Pine Grove.....         | 2,989.11     | 2,568.08     |
| Consumed on laterals.....    | 2,376.11     | 2,082.08     |
| Lehigh and Wyoming Coal.     | 1,389.16     | 8,895.04     |
| Tot. anth'cite paying fr't.  | 155,398.11   | 168,054.06   |
| Bituminous.....              | 3,433.08     | 2,868.09     |
| Total all kinds paying fr't. | 159,031.17   | 170,922.15   |
| Coal for company's use.....  | 9,375.00     | 7,866.13     |
| Total tonnage for week.....  | 168,406.17   | 178,788.28   |
| Previously this year.....    | 4,407,839.11 | 5,786,897.15 |
| Total to date.....           | 4,576,146.17 | 5,965,045.03 |

SHIPPED BY SCHUYLKILL CANAL.

|                             |            |            |
|-----------------------------|------------|------------|
| From Schuylkill Haven.....  | 16,130.00  | 18,751.00  |
| Port Clinton.....           | 2,587.00   | 2,598.00   |
| Total tonnage for week..... | 18,717.00  | 21,449.00  |
| Previously this year.....   | 440,871.00 | 617,390.00 |
| Total to date.....          | 459,588.00 | 638,834.00 |

The coal trade at Streator, Ill., is much more dull now than at this time last year.

At Nashannock, Pa., Bethel shafts are both idle yet; Spearman is running full time; Humburg and Filer's shafts are on full time; Phillips' bank is also on full time; Five Points is on once in a while.

The Etna Coal and Salt Co., with a capital of \$100,000, has been incorporated in West Virginia. The business will be mining and manufacturing, and carried on at Hartford City.

A large area of surface over the Diamond mine at Scranton, Pa., caved in last Thursday morning, completely clogging up many chambers and passages, and causing damages which will require many months to repair. Between 300 and 400 men will be thrown out of employment.

The mining situation remains about the same as last week. The miners adhere to their demand of one-half cent advance for mining, and the operators have no crafts for them to load, and will not have until a rise in the river will allow them to come up, so it is not known what action they will take. An immense number of empty barges are on the way up the Ohio and will arrive here as soon as there is sufficient water. On Tuesday the miners of the valley held a delegate meeting at Schiller Hall, Pittsburgh, which was largely attended. The meeting was a closed one, no person being admitted except delegates. The object of the meeting was understood to be the formation of an organization composed of all the miners on the Monongahela and Youghiogheny rivers and along the various railroads leading out of Pittsburgh, for mutual benefit and protection. —Elizabeth (Pa.) Herald, 5th.

All the shafts at Streator, Ill., are working steadily.

On Monday of last week, some workmen engaged in opening Elm street, Norristown, Pa., discovered a vein of coal about 16 feet below the surface of the ground, at the point where the street crosses the Stony Creek Railroad. At the place it was found the vein was only a few inches in thickness, but it has been followed some 20 feet and increases in breadth. Specimens of the coal, which is bituminous, have been tried by R. T. Schall & Co., and found to burn very readily.

Montgomery, Jolliff & Johnson form a new coal firm which is going to run the old Reed

Works, near Greenfield, on the Monongahela.

The Oglesby Coal Company shaft, opposite La Salle, Ill., is said to be raising 200 tons of coal daily, and they are preparing to sink another shaft.

A Pottsville, Pa., special to a New York daily says there is a prospect of serious trouble ahead in the anthracite coal trade, though the trade papers are making a combined effort to obviate it by denying the reports about it. There is excellent authority for the statement that the coal combination will undoubtedly have a serious if not fatal disagreement on the question of apportionment for the next year. Lehigh operators are dissatisfied and insisting on a new agreement more favorable to them. A general war is expected.

Thomas Moore, who had a contract with the Philadelphia Gas Works to furnish 250,000 tons of coal in 1876, testified before Mr. Atwell, Deputy Secretary of Internal Affairs, that in consequence of the refusal of the Pennsylvania Railroad to carry the coal the trustees of the gas works were compelled to make another contract at an increase over the first of \$1 per ton, thus involving an additional expense to the city of Philadelphia of \$250,000.

The production of the Schuylkill region for the week ending October 5 was 163,284 tons, as against 166,426 tons for the same week of last year. The total production was 427,014 tons, against 365,034 tons for the week of last year. The production of the year so far foots up 12,060,501 tons, against 14,526,798 tons for the corresponding period of last year. A decrease of 2,466,297 tons.

The coal trade sums up this week as follows, compared with the corresponding week of last year:

|                         | Oct. 5, 1878. | Week.      | Year.   | Week.      | Year. |
|-------------------------|---------------|------------|---------|------------|-------|
| P. & E. R. & C. L.....  | 163,284       | 3,507,511  | 166,426 | 5,086,617  |       |
| L. V. R. R. R. R.....   | 67,073        | 2,401,279  | 107,341 | 3,190,301  |       |
| P. & E. R. R. R. R..... | 944           | 25,773     |         | 36,874     |       |
| L. & S. R. R. R.....    | 33,073        | 1,375,441  | 50,648  | 1,744,650  |       |
| D. L. & W. R. R. R..... | 48,005        | 1,535,071  | 3,411   | 1,416,543  |       |
| Penn. Coal Co.....      | 31,609        | 649,480    | 5,127   | 229,541    |       |
| Del. & Hudson.....      | 48,073        | 1,132,051  |         | 1,344,546  |       |
| Penn. Canal.....        | 12,558        | 257,753    | 2,397   | 243,531    |       |
| Shamokin.....           | 14,994        | 479,939    | 21,729  | 338,186    |       |
| Jenkins Valley.....     | 5,771         | 243,347    | 77,520  | 245,188    |       |
| S. N. & E. R. R. R..... | 532           | 27,599     | 855     | 14,741     |       |
| Total anthracite.....   | 427,014       | 12,060,501 | 505,034 | 14,526,798 |       |
| Bituminous.....         | 395,034       |            |         | 12,060,501 |       |
| Increase.....           | 61,990        |            | Dec.    | 2,466,297  |       |

Reading Coal and Iron Co. may serve as an example to business men in their thorough economy. Every pound of their coal, whether it be in the form of dust or nuggets, is disposed of. The fine coal is carefully screened, and the coal and dust thus separated, the latter shipped to Baltimore to be used for burning oyster shells. —Lancaster Examiner.

The *Miners' Journal* of Oct. 11 says: For the purpose, no doubt, of stock speculation, the newspapers are again reporting the certainty of a break in the combination in consequence of the dissatisfaction of the Schuylkill and Lehigh interests. The only basis for the whole report is the fact that Lehigh and Schuylkill have light stocks on hand and are largely oversold, and they are short over 2,000,000 tons in their production as compared to last year, while the two Northern companies have large stocks on hand unsold, and their production is about 50,000 tons in excess of last year. Speculators infer from this that Schuylkill and Lehigh are naturally dissatisfied in consequence; but they forget that the basis of tonnage for the several interests was not calculated from last year's production alone; they forget that last year, when Schuylkill and Lehigh were straining every nerve for ten whole weeks, the two Northern companies were doing nothing, and the fact that they now have large stocks of unsold coal on hand is to the mind of "Broken Coal" an indication of good management on the part of their officers, who held it through the low prices of the past summer, knowing that very much better prices would be obtained for it when the fall trade commenced. And they can now reap the benefit of their good judgment.

## IRON.

The following table, from the *Marquette Mining Journal*, shows that the lake shipments of iron ore from the Lake Superior district since the opening of navigation the present year, up to Wednesday, October 9, together with the shipments for a corresponding period in 1877:

|                     | 1877.   | 1878.   |
|---------------------|---------|---------|
| From Marquette..... | 487,000 | 457,580 |
| From Escanaba.....  | 338,980 | 370,710 |
| From L'Anse.....    | 53,361  | 30,621  |
| Total.....          | 864,090 | 858,950 |

Showing a decrease of 5141 gross tons.

We clip the following concerning Lake Superior iron mines from the *Mining Journal*: The Bullock diamond drill, near the M. H. & O. depot, at Ishpeming, is down about 600 feet, and at last accounts is in lean ore. The drill on the Iron Cliffs property is also down about that distance, and also drilling through lean ore. The Cleveland Co. are determined to find what they have on their property, and to further ascertain, work is commenced on still another diamond drill hole. The Manganese Iron Ore Co. are shipping their product as fast as it can be taken out. The Cleveland Iron Mining Co. have purchased their entire product for this season. The prospects are that the present working force of the mines will not be materially reduced during the coming winter. Work is entirely suspended for the season at R. Nelson's Cleveland hematite mine, and the pumps and machinery removed. The season's work has proved highly satisfactory and profitable. The mine looks even better than ever, and the ore holds its own as to quality and quantity. Mr. Nelson will erect extensive hoisting and pumping machinery on the property next spring, which will enable him to more than double this year's product.

## PRECIOUS METALS.

Bullion Shipments.—Standard, Sept. 23, \$16,482.90; Northern Belle, Sept. 23, \$4135.10; Leopard, Sept. 26, \$8200; Hussey, Sept. 26, \$4500.50; Hampton, Bingham, Sept. 24, \$3000; Bodie, Sept. 26, \$14,000; total to date, \$176,000; Sept. 29, \$12,200;

Sept. 30, \$8400; Silver Reef, \$13,685.10; Germania, \$4000; \$2900; Butte, \$7481.51; Ontario, \$6254.44; \$5332.50; \$2746.62; \$3387.12; Tybo Consolidated, Sept. 25, \$3973.78; total for Sept. to date, \$49,193.29; Endowment, Oct. 1, \$2844.78; total to date, \$30,120.70; Independence, Sept. 30, \$7000; California, Sept. 28, \$82,268.30; total to date, \$231,083.21; Consolidated Virginia, Sept. 28, \$66,947.56; total to date, \$173,201.90; Indian Queen, Sept. 23, \$5218.06; Cortez, Sept. 29, \$6147.45; Manhattan, Sept. 28, \$11,800; Sept. 30, \$11,503; Christy, Oct. 2, \$6903; Tybo Consolidated, Sept. 27, \$7504.30; Bodie, Sept. 23, \$9972.13; Standard, Sept. 30, \$20,062.65; Northern Belle, Sept. 28, \$5317.83. —Mining Press.

The Arizona Sentinel, of Sept. 21, publishes the following: Bullion shipments for the week ending Sept. 20, 1878:

|                                 |           |
|---------------------------------|-----------|
| Sept. 14-2 bars Peck.....       | \$4,090   |
| 15-3 bars Tiptop.....           | 8,097     |
| 17-2 bars Peck.....             | 3,165     |
| 17-1 bar B. & K.....            | 1,508     |
| 17-10,928 pounds Stonewall..... | 90,000    |
| 17-1000 pounds Final Mill.....  | 9,000     |
| 17-1500 pounds Globe Ore.....   | 3,000     |
| 19-3 bars Tiptop.....           | 5,000     |
| Total.....                      | \$116,900 |

The shipment of 10,928 pounds of Stonewall Jackson ore is of the same rich stuff that has always attracted so much attention in San Francisco, and which has realized from \$7 to \$10 per pound. Our estimate of \$90,000 for this lot, is probably below, rather than over, the real value. The 1600 pounds of concentrations are from Baldwin's Final Mill, and were made from one of the Silver King dumps; they are valued at over \$1 per pound. Last week we noted shipment hence of \$79,723 bullion; that figure included 25,000 pounds of Silver King concentrations, which we valued at that many dollars. Returns of sales of that lot show that it realized at the rate of \$700 per ton, or \$1.85 per pound. Therefore, we can add \$21,250 more to that week's shipment, making the total for the week ending Sept. 13, \$100,973. Even then this does not include proceeds of over 2000 pounds of Silver King "nuggets," which are melted at refinery, and from which we have heard no returns; they have usually realized \$8 or \$9 per pound.

A tramp went into Leadville, Colorado, a short time ago, without a cent in his pocket. He commenced to dig a hole in the ground, and three feet below the surface struck a rotten, chalky substance, and the people jeeringly called his "find" Bessick's whitewash mine. But Bessick found the stuff rich in carbonate of lead carrying silver, and digging down, found boulders and pebbles that were coated with silver chloride. From the surface down 200 feet the mine has paid richer than any other in the country, yielding thus far \$64,000 a month.

The Leadville Eclipse of September 19 says: It is with no small satisfaction that we perceive the facts of the constant and rapid development of our mineral resources and the unprecedented growth of our city of Leadville. Leadville has now a daily production of 100 tons of high grade ore, milling from 70 to 400 ounces, and a capacity of from 100 to 300 tons a day of low grades, properly lead ore, not profitable to touch at present, unless a need should be created for it by the smelters, which we anticipate will be the case ere long, and give a market for really valuable ore that has hitherto scarcely brought more than iron flux. From this we conclude that Leadville will ship no more lead than will necessarily be required to smelt the high grades, especially the silver-iron ores and hard carbonates, and the superabundance of good smelting ore is undoubtedly destined to make Leadville the great smelting-pot of Colorado.

The Arizona bullion product this year will be in the neighborhood of \$8,000,000.

The Mosquito Gulch ledge, at Cariboo, shows rock that assays \$720 to the ton, at a depth of 20 feet.

The Richmond Mining Co.'s smelting works burned to the ground September 27. The bin, with 175,000 bushels of coal, was destroyed. Total loss about \$85,000.

How thoughtless, or habitually reckless of peril to their own and other lives miners may become, is strikingly exemplified by the fatal "accident" at the Prospect shaft, Wilkesbarre, where one of a number of men working to get rid of an accumulation of explosive gas, walked up to the point of danger with an exposed light. That proceeding cost four workmen their lives and their families the means of support.

At the Spanish Consul's office the reply is reiterated that the recent order for the admission of machinery into the five eastern ports of Cuba free of





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The iron and steel parts are polished or japanned. The wood is painted dark.  
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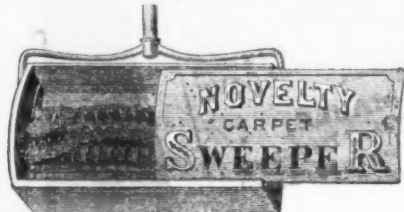
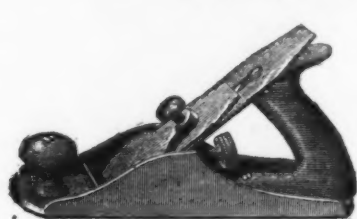
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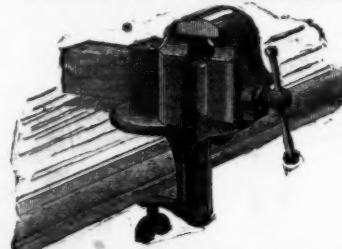
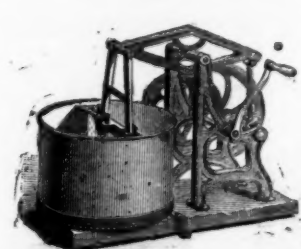
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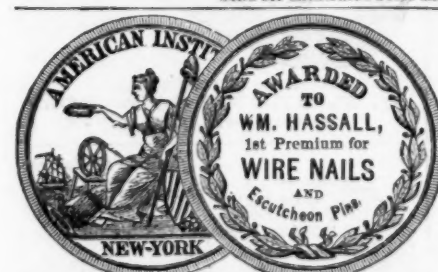


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The well-known desirable properties of a perfect nail are, that the POINT should be sharp, the SHANK stiff, to drive without crippling under the hammer, soft enough to clinch readily, while sufficiently tough to avoid all danger from the "drawing the clinch" or breaking the neck under the head. These properties we claim for the

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In the process of manufacture the metal is compressed under the head, which gives the nail great strength where it is required (between the shoe and hoof), and the cold rolling gives it a stiffness attained in no other way, while the quality of the metal used insures a clinch and point unsurpassed by any nail ever offered in the market. Samples and prices sent on application.

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| 10 inch.         | 8 in. driving wheel. Can be used by a child.                | each, \$14.00 |
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| 14 "             | 8 in. driving wheel, wt. 34 1/2 lbs. Can be used by a lady. | " 20.00       |
| 16 "             | 8 in. driving wheel, wt. 36 1/2 lbs. One man size.          | " 22.00       |
| 18 "             | 8 inch driving wheel. One man size.                         | " 24.00       |

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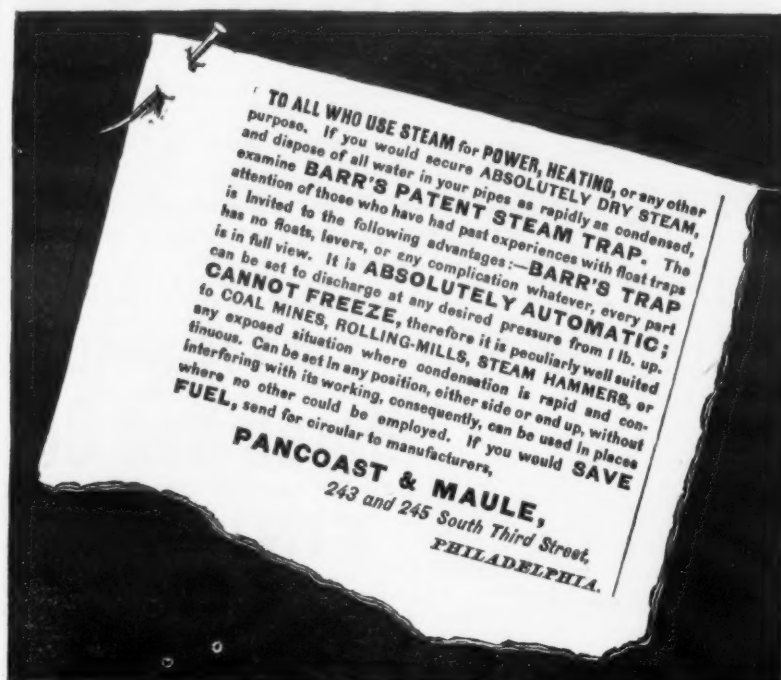
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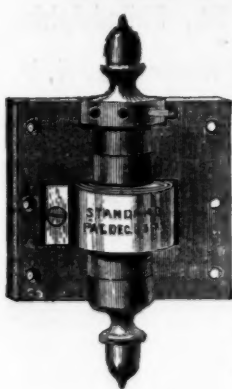
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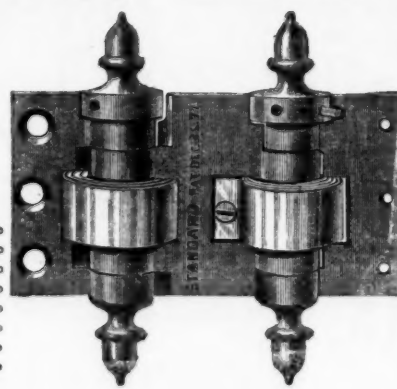
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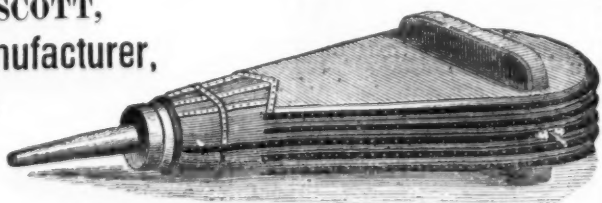
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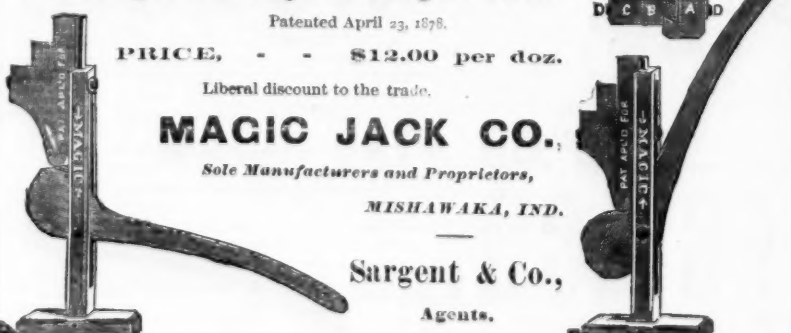
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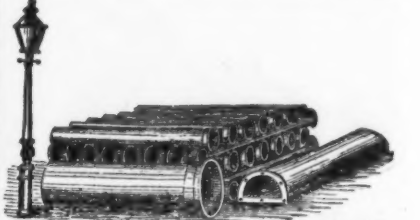
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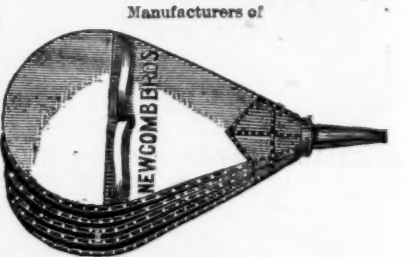
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| Tale Lock Mfg. Co., Chambers, N. Y.                           | 17 | Landis, F. A., Providence, R. I.               | 33 |
| Dinner Pail & Luster.   |    | Landis, F. A., Providence, R. I.               | 33 |
| Haight, Jos. Forchester, N. Y.                                | 13 | Landis, F. A., Providence, R. I.               | 33 |
| Discount Tables.  |    | Landis, F. A., Providence, R. I.               | 33 |
| Jennings S. H., Deep River, Conn.                             | 20 | Landis, F. A., Providence, R. I.               | 33 |
| Door and Gate Springs.  |    | Landis, F. A., Providence, R. I.               | 33 |
| Dunne F. H., 18 Fulton, N. Y.                                 | 40 | Landis, F. A., Providence, R. I.               | 33 |
| Drill Chucks, Manufacturers of.                               |    | Landis, F. A., Providence, R. I.               | 33 |
| Chubman A. B., Hartford, Conn.                                | 40 | Landis, F. A., Providence, R. I.               | 33 |
| Drilling Machines, Makers of.                                 |    | Landis, F. A., Providence, R. I.               | 33 |
| Thorne De Haven & Co., Philadelphia.                          | 37 | Landis, F. A., Providence, R. I.               | 33 |
| Wiley & Russell, Greenfield, Mass.                            | 37 | Landis, F. A., Providence, R. I.               | 33 |
| Drop Forgings.  |    | Landis, F. A., Providence, R. I.               | 33 |
| Rose Wm. & Bro., West Philadelphia, Pa.                       | 6  | Landis, F. A., Providence, R. I.               | 33 |
| Merrill C. & Son, 56 Grand, N. Y.                             | 6  | Landis, F. A., Providence, R. I.               | 33 |
| Drop Hammers.   |    | Landis, F. A., Providence, R. I.               | 33 |
| The Stiles & Parker Press Co., Middletown, Ct.                | 39 | Landis, F. A., Providence, R. I.               | 33 |
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| Edge Tools.   |    | Landis, F. A., Providence, R. I.               | 33 |
| The D. R. Barton Tool Co., Rochester, N. Y.                   | 8  | Landis, F. A., Providence, R. I.               | 33 |
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| Elevators.  |    | Landis, F. A., Providence, R. I.               | 33 |
| Crane Bros. Mfg. Co., Chicago, Ill.                           | 30 | Landis, F. A., Providence, R. I.               | 33 |
| Mason Volney W. & Co., Providence, R. I.                      | 30 | Landis, F. A., Providence, R. I.               | 33 |
| Stokes & Parsh, Philadelphia, Pa.                             | 30 | Landis, F. A., Providence, R. I.               | 33 |
| Elevator Buckets.   |    | Landis, F. A., Providence, R. I.               | 33 |
| Hubert Buckle Co., Chicago, Ill.                              | 37 | Landis, F. A., Providence, R. I.               | 33 |
| Rowland T. F., Brooklyn, N. Y.                                | 37 | Landis, F. A., Providence, R. I.               | 33 |
| Emery Wheels.   |    | Landis, F. A., Providence, R. I.               | 33 |
| Lehigh Valley Emery Wheel Co., Weisport, Pa.                  | 40 | Landis, F. A., Providence, R. I.               | 33 |
| Engineers, Manufacturers of.                                  |    | Landis, F. A., Providence, R. I.               | 33 |
| Southern States Coal, Iron & Land Co., South Pittsburg, Tenn. | 6  | Landis, F. A., Providence, R. I.               | 33 |
| Todd Joseph C. 10 Barclay, N. Y.                              | 6  | Landis, F. A., Providence, R. I.               | 33 |

|  |    |
|--|----|
| Stone Ironworks.                                     |    |
| Metal Stamping & Enameling Co., St. Louis, Mo.       | 1  |
| Stove Boards, Manufacturers of.                      |    |
| Ansonia Brass and Copper Co., 19 and 21 Cliff, N. Y. | 9  |
| Grundy Geo. & Co., 165 Greenwich, N. Y.              | 9  |
| Stove Pipe.  |    |
| Chicago Stamping Co., Buffalo, N. Y.                 | 1  |
| Stove Repairs.                                       |    |
| Mohr W. C., Chicago, Ill.                            | 6  |
| Tacks.   |    |
| American Tack Co., Fairhaven, Mass.                  | 6  |
| Field A. & Sons, Taunton, Mass.                      | 6  |
| Grundy Geo. & Co., 165 Greenwich, N. Y.              | 9  |
| Shelton Co., Birmingham, Ct.                         | 14 |
| Taps and Dies.                                       |    |
| Turner & Son, Pawtucket, R. I.                       | 39 |
| Manning H. S. & Co., 111 Liberty, N. Y.              | 39 |
| Wiley & Russell, Greenfield, Mass.                   | 39 |
| Tin Plate, Manufacturers of.                         |    |
| U. S. Iron and Tin Plate Co., Pittsburgh, Pa.        | 5  |
| Travels.   |    |
| Bruce Geo. W., 1 Platt, New York.                    | 5  |
| Try Squares, Bevels, &c., Makers of.                 |    |
| Disston Henry & Sons, Phila.                         | 29 |
| Tube Expanders.                                      |    |
| Turner & Son, Pawtucket, R. I.                       | 39 |
| Twist Drills, Makers of.                             |    |
| Morse Twist Drill & Mach. Co., N. Bedford, Mass.     | 35 |
| Upstoppers' Goods.                                   |    |
| Turner & Son, Pawtucket, R. I.                       | 39 |
| Valves, Gas, Water and Steam.                        |    |
| Ludlow Valve Mfg. Co., Troy, N. Y.                   | 33 |
| Shaw & Hudson Mfg. Co., Waterford, N. Y.             | 33 |
| Ventilators.   |    |
| Bracher Ventilator Co., 3 Park Row, N. Y.            | 8  |
| Vices.   |    |
| Athol Machine Co., Athol, Mass.                      | 12 |
| Bailey Wringing Machine Co., 90 Chambers, N. Y.      | 25 |
| Wells Bros., Greenfield, Mass.                       | 25 |
| Wagon Jack.  |    |
| Wagon Jack Co., Mishawaka, Ind.                      | 26 |
| Watchmen's Time Detectors.                           |    |
| Buerk J. E., Boston, Mass.                           | 3  |
| Weather Strips.                                      |    |
| Weather Ventilator Co., 3 Park Row, N. Y.            | 8  |
| Wedges.  |    |
| Am. Sleigh and Carriage Iron Co., Boston, Mass.      | 17 |
| Wheels.  |    |



# RIEHLE BROS.' STANDARD SCALES AND TESTING MACHINES



New Style  
Warehouse  
Scales.  
—  
Iron Tops.

Riehle Bros.' Machines for testing Band Iron, Wire, and all other materials, by tensile, transverse, and crushing strains, from 100 lbs. to 500 tons capacity. New Machine for testing lubricants. Scales for Railroads, Elevators and Wharves. Scales for Furnaces, Rolling Mills, Mines, &c. Testing Machines adopted by U. S. Government. Specimens of materials tested daily at the Works. Trucks for Depots, Warehouses, etc. Highest Centennial Award. Office & Works, 9th St., above Master, Philadelphia. Warehouses, 50 & 52 S. 4th St., Philadelphia. New York Office, 91 Liberty St.



TRADE MARK.  
The Atlantic White Lead  
and Linseed Oil Co.,

MANUFACTURERS OF  
White Lead (Atlantic), Red Lead,  
Litharge & Linseed Oil.  
ROBERT COLGATE & CO.,  
287 Pearl Street, New York.

John T. Lewis & Bros.,  
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MANUFACTURERS OF  
Pure White Lead, Red Lead, Litharge,  
Orange Mineral, Linseed Oil,  
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Manufacturers of the well-known brand of  
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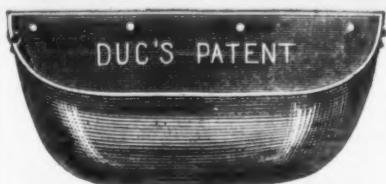
TRADE MARK.  
ALSO MANUFACTURERS OF  
LINSEED OIL.  
182 Front Street, NEW YORK

Brooklyn White Lead Co.



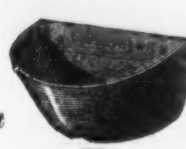
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# DUC'S IMPROVED ELEVATOR BUCKET.



THE STORE-HOUSE BUCKET.  
(Partial straight front.)  
In 12 in., 14 in., 16 in. and 17 in. Sizes.

Made of Best Charcoal Stamping Iron.  
No Corners to Catch.  
Light Running and Very Durable.  
The only Scientifically Constructed Elevator Bucket  
in the Market.



THE  
MILL BUCKET.  
In 3 1/2 in. to 10 in.  
Sizes.

T. F. ROWLAND,

Sole Manufacturer,  
CONTINENTAL WORKS, Brooklyn, E. D., N. Y.

Send for Circular.

# NICHOLSON FILE CO., FILES AND RASPS.

Manufacturers of

## Filers' Tools & Specialties.

Manufactory and Offices at Providence, R. I.

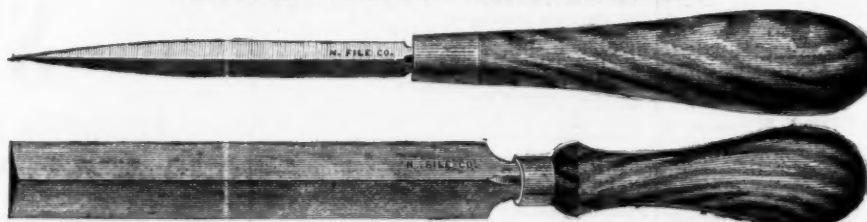
The following space will be used in illustrating our specialties, the matter being changed weekly.

### STUB FILES AND HOLDER.

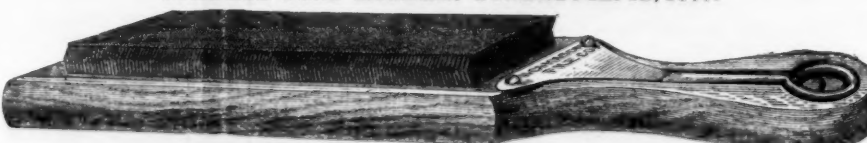
FILES DETACHABLE. Patented June 4th, 1878.



### MACHINISTS' SCRAPERS.



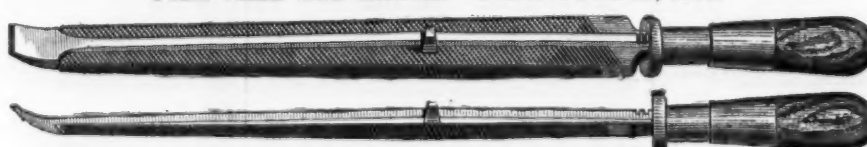
SURFACE FILE HOLDER. Patented June 12, 1877.



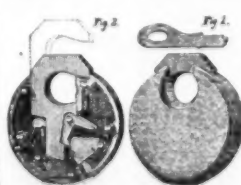
FILE CARD AND BRUSH. Patented Feb. 12, 1878.



WISE FILE HOLDER. Patented June 12, 1877.



WISE FILE HOLDER. Patented June 12, 1877.



### D. K. MILLER LOCK CO.,

712 Cherry St., Philadelphia.

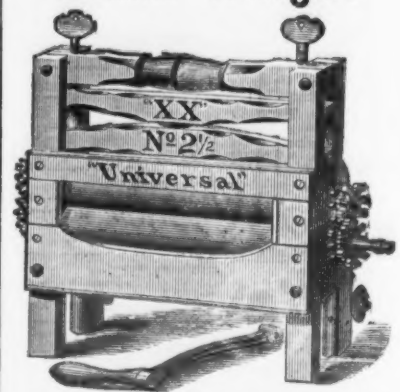
Greatly improved. Prices reduced. As now made it is the best and most economical Pad Lock for all uses extant. Appreciated by all who use them. For simplicity, compactness, durability, convenience and security it has no equal. Springs now made from the celebrated Phosphor Bronze. We make these Locks with Master Keys when so ordered. Largely used by the U. S. Government, Railroads, Corporations, etc., etc. Samples of 2 1/4 in. size sent per mail on receipt of one dollar.

95 Chambers St. E. S. DODGE

### PRINTING

COMPANY. ED. HUTCHINGS, Sup't. NEW YORK.

# THE "OLD RELIABLE" UNIVERSAL Clothes Wringer.



Improved with Rowell's Double Cog-Wheels on both ends of each roll.

Over 500,000 sold!

And now in use, giving "Universal" satisfaction.

EVERY WRINGER WARRANTED.

Be sure and inquire for the "Universal."

Sold by the Principal Jobbers in Hardware and House-Furnishing Goods everywhere.

Special rates given for export.

Metropolitan Washing Machine Co.

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ROUND PLATE.

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Phenix Caster Co., Indianapolis, Ind.—  
"Your Casters are splendid; can't praise them too much."

A. FIELD & SONS.

### TUCKER & DORSEY, MANUFACTURERS.



Our Lock has no Rival

### PHILADELPHIA HYDRAULIC WORKS,

Evelina and Levant Sts.,

General Machinists

and Manufacturers of

Steam Pumps and Steam Fire Engines.

Manufactured by

STEAM CRANE BROS.,

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CHICAGO.

THE

Morris Burglar-Proof Sash Lock.

Patented July 2, 1878. The Safest! The Simplest!

The most Reliable! The Best! No springs to get out of order. Sold by all hardware jobbers. Manufactured by the MORRIS SASH LOCK MFG. CO.,

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Patent Portable Hoisting Machines

PRICE LIST.

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8 ft. 500 lb. \$22 50 \$1 00

10 1,000 24 00 1 30

12 2,000 30 00 1 50

14 3,000 40 00 1 75

16 4,000 50 00 2 00

18 5,000 60 00 2 25

20 6,000 75 00 2 50

22 8,000 100 00 3 00

24 10,000 125 00 3 50

26 15,000 200 00 4 75

28 20,000 300 00 6 00

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Also Manufacturers of Machin-

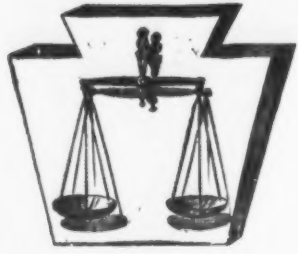
ists' Tools.

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# Henry Disston & Sons,



## FILE COMPANY, Limited.

FACTORY, Tacony, Philadelphia.

OFFICES, - Front and Laurel Streets, Philadelphia, Pa.

All kinds of

**TAPERS**

made to order.

**DISSTON CHOICE TAPER.**



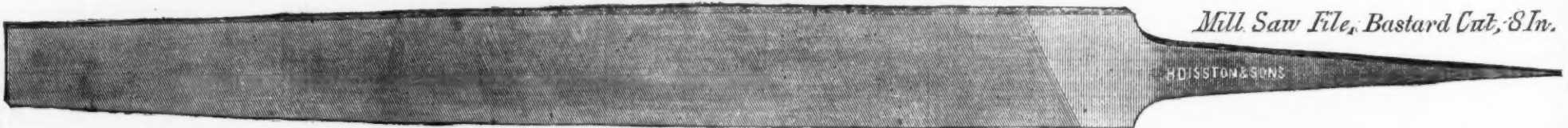
Price same as Regular Taper, length to include the Tip.

**Slim and Regular**

**TAPERS**

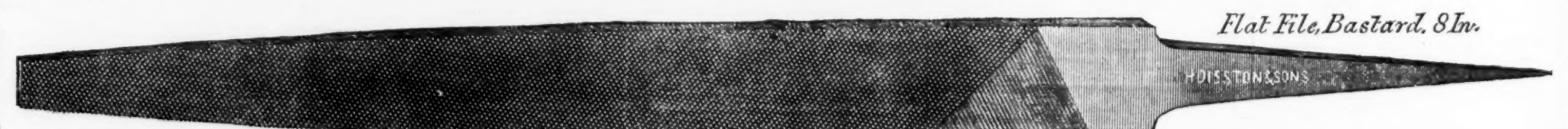
kept in Stock.

*Mill Saw File, Bastard Cut, 8 In.*



|        |        |      |      |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|--------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Size,  | 4      | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16    | 17    | 18    | 20    | Inch. |
| Price, | \$1 40 | 1 60 | 1 85 | 2 20 | 2 60 | 3 00 | 3 65 | 4 35 | 5 25 | 6 10 | 7 30 | 8 75 | 10 50 | 12 50 | 14 75 | 20 00 |       |

*Flat File, Bastard, 8 In.*



|        |        |      |      |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|--------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Size,  | 4      | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16    | 17    | 18    | 20    | Inch. |
| Price, | \$1 40 | 1 60 | 1 85 | 2 20 | 2 60 | 3 00 | 3 65 | 4 35 | 5 25 | 6 10 | 7 30 | 8 75 | 10 50 | 12 50 | 14 75 | 20 00 |       |

*Round File, Bastard, 8 In.*



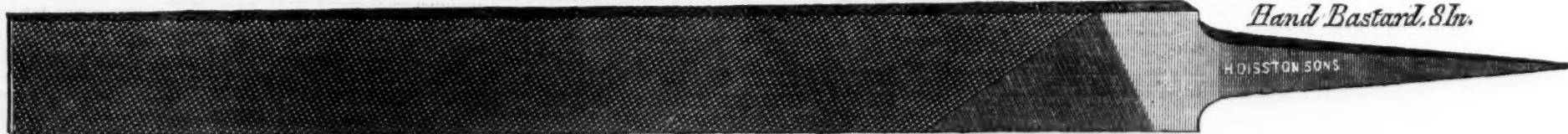
|        |        |      |      |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|--------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Size,  | 4      | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16    | 17    | 18    | 20    | Inch. |
| Price, | \$1 40 | 1 60 | 1 85 | 2 20 | 2 60 | 3 00 | 3 65 | 4 35 | 5 25 | 6 10 | 7 30 | 8 75 | 10 50 | 12 50 | 14 75 | 20 00 |       |

*Four-Square File, Bastard, 8 In.*



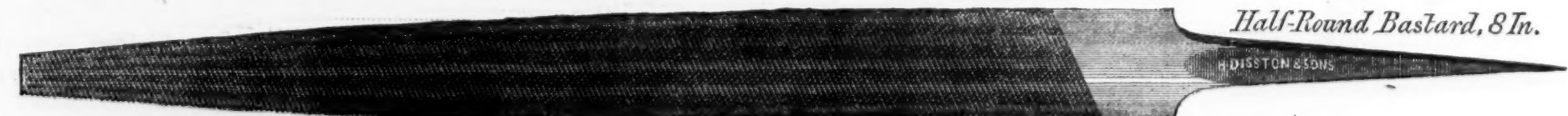
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|--------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Size,  | 4      | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16    | 17    | 18    | 20    | Inch. |
| Price, | \$1 40 | 1 60 | 1 85 | 2 20 | 2 60 | 3 00 | 3 65 | 4 35 | 5 25 | 6 10 | 7 30 | 8 75 | 10 50 | 12 50 | 14 75 | 20 00 |       |

*Hand Bastard, 8 In.*



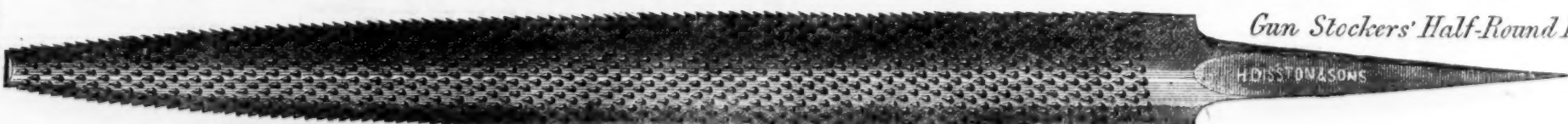
|        |        |      |      |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|--------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Size,  | 4      | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16    | 17    | 18    | 20    | Inch. |
| Price, | \$1 60 | 1 90 | 2 25 | 2 65 | 3 10 | 3 60 | 4 25 | 5 00 | 5 75 | 6 75 | 8 00 | 9 50 | 11 25 | 13 25 | 15 50 | 22 00 |       |

*Half-Round Bastard, 8 In.*



|        |        |      |      |      |      |      |      |      |      |      |      |      |       |       |       |       |       |
|--------|--------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Size,  | 4      | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16    | 17    | 18    | 20    | Inch. |
| Price, | \$1 60 | 1 90 | 2 25 | 2 65 | 3 10 | 3 60 | 4 25 | 5 00 | 5 75 | 6 75 | 8 00 | 9 50 | 11 25 | 13 25 | 15 50 | 22 00 |       |

*Gun Stockers' Half-Round Rasp, 8 In.*



All the general Standard Files kept in Stock.

All the different cuts kept in stock or made to order.

All the different lengths and cuts of the regular Standard Files, and all our special Files kept in stock. All kinds of other special Files made to order. Every File of the above brand is made with the greatest care from the best of steel, and inspected and proved in the most thorough manner before leaving the works. Every File stamped "Disston" is warranted as perfect as Files can be made, and are considered superior to any other Files known to us. The increasing demand for them, and the growing favor in which they are held by all who use them, is the best evidence of their excellence.



## New York Wholesale Prices, October 16, 1878.

## HARDWARE.

[illegible]

|   |                          |            |        |
|---|--------------------------|------------|--------|
| Harrison Miller's Fancy Butts.....                |                          | dls 60x70  |        |
| Hutton Krammel Loose Joint.....                   |                          | dls 80x100 |        |
| Huston Finish, Plain.....                         |                          | dls 80x100 |        |
| " " With Silvered Arrows.....                     |                          | dls 70x100 |        |
| Loose Pin, Wrt.....                               |                          | dls 60x70  |        |
| WROUGHT IRON.                                     |                          |            |        |
| Last Joint Larro.....                             |                          | dls 90x100 |        |
| " N. Narrow.....                                  |                          | dls 90x100 |        |
| " Broad.....                                      |                          | dls 90x100 |        |
| Loose Joint, Iron.....                            |                          | dls 90x100 |        |
| Table Butts, Back Flaps &c.....                   |                          | dls 90x100 |        |
| Unst. Blud., Regular.....                         |                          | dls 30x100 |        |
| " Light.....                                      |                          | dls 30x100 |        |
| Loose Pin, Wrt.....                               |                          | dls 60x70  |        |
| Spring Hinges.                                    |                          |            |        |
| American Spiral Spring Butt Co., Jap'd.....       |                          | dls 25     |        |
| Springs.....                                      | Fancy.....               | dls 25     |        |
| Sabin Mfg. Co.'s Double Acting.....               |                          | dls 35     |        |
| Centennial.....                                   | Ornamental.....          | dls 35     |        |
| Union Spring Hinge Co.'s.....                     |                          | dls 25     |        |
| Springing.....                                    | Union Mfg. Co.....       | dls 25     |        |
| Butter's.....                                     |                          | dls 25     |        |
| Rim.....  | Palmer.....              | dls 25x50  |        |
| " Seymour.....                                    |                          | dls 60x100 |        |
| Hicks & Goldmark.....                             | E. B. 1-10 Ground.....   | dls 70x100 |        |
| " Lull & Porter.....                              |                          | dls 60x100 |        |
| Nicholson.....                                    |                          | dls 40x100 |        |
| D. W. P. F. 1-10.....                             |                          | dls 35     |        |
| Clark's, Nos. 1, 3, 4, 10 and 45.....             |                          | dls 60x100 |        |
| Buffalo "Noiseless".....                          |                          | dls 75     |        |
| Barett's.....                                     |                          | dls 70x100 |        |
| Butchers' Cleavers.                               |                          |            |        |
| Humason & Beckley Mfg. Co.....                    |                          | dls 20     |        |
| D. R. Barton Tool Co.....                         |                          | dls 20     |        |
| Beatty's.....                                     |                          | dls 20     |        |
| \$1.50 16.00 21.50 24.00 27.00 30.00 33.50 36.50  |                          |            |        |
| Hart Mfg. Co.....                                 |                          | dls 60x100 |        |
| \$20.00 26.00 29.50 33.00 37.00 41.50 45.00       |                          |            |        |
| Cann Openers.                                     |                          |            |        |
| Messenger's Comet.....                            | # doz \$3.00,            | dls 30     |        |
| Lyman's.....                                      | # doz \$3.75,            | dls 30     |        |
| Poole.....  | # doz \$3.75,            | dls 30     |        |
| No. 5.....  | # doz \$2.25,            | dls 60     |        |
| Eureka.....                                       | # doz \$2.50,            | dls 60     |        |
| " With Silvered Arrows.....                       | # doz \$5.00,            | dls 60     |        |
| Star.....   | # doz \$5.00,            | dls 60     |        |
| Caps—Percussion, E. Iccs.                         |                          |            |        |
| Hicks & Goldmark.....                             | E. B. 1-10 Ground.....   | dls 35     |        |
| " D. W. P. F. 1-10.....                           |                          | dls 35     |        |
| Colt's 1-10.....                                  |                          | dls 35     |        |
| Ely's E. B.....                                   |                          | dls 35     |        |
| " Double Waterproof, 1-48, \$1.50 1-128, \$1.50,  |                          | dls 35     |        |
| Colt's.....                                       |                          | dls 35     |        |
| Carden.....                                       |                          | dls 35     |        |
| Cards..... Horse and Curry.....                   |                          | dls 35x60  |        |
| Cotton.....                                       |                          | dls 25x100 |        |
| Water Set Co.....                                 |                          | dls 25x100 |        |
| Carpet Stretchers.                                |                          |            |        |
| Cast Steel, Polished.....                         | # doz \$5.00,            | dls 30     |        |
| " Iron Steel Points.....                          | # doz \$2.00,            | dls 45x5   |        |
| Chairs.   |                          |            |        |
| Bed.....  |                          | dls 55     |        |
| Deep Seater.....                                  |                          | dls 40     |        |
| Deep Seater.....                                  |                          | dls 40     |        |
| Cattle Leaders.                                   |                          |            |        |
| Hackney.....                                      |                          | dls 10x70  |        |
| Humason, Beckley & Co.'s.....                     |                          | dls 60     |        |
| Sargent's.....                                    |                          | dls 60x100 |        |
| Chain.....  |                          | dls 60x100 |        |
| Trace, 60-1-2..... by the case, # pair 45¢        |                          | dls 45c    |        |
| " 7-10..... by the case, # pair 40¢               |                          | dls 40c    |        |
| German Halter Chain.....                          | # pair 30¢               | dls 30c    |        |
| Galvanized Pump Chain.....                        | # 10 size dls 10¢        | dls 10c    |        |
| Jack Chain, Iron.....                             |                          | dls 60x100 |        |
| Brass.....  |                          | dls 60x100 |        |
| Chalk.  |                          |            |        |
| White.....  | # gross 50¢ net          | dls 50c    |        |
| Blue.....   | # gross 50¢ net          | dls 50c    |        |
| White Crayons.....                                | # gross 15¢ net          | dls 15c    |        |
| D. R. Barton Tool Co. (all kinds).....            |                          |            | dls 20 |
| Socket Framing, Crossman.....                     |                          | dls 60x100 |        |
| " Burr.....                                       |                          | dls 60x100 |        |
| " Merril.....                                     |                          | dls 60x100 |        |
| " Douglas.....                                    |                          | dls 70     |        |
| " Farmers, Crossman.....                          |                          | dls 60x100 |        |
| " Burr.....                                       |                          | dls 60x100 |        |
| " Merril.....                                     |                          | dls 70     |        |
| " Douglas.....                                    |                          | dls 70x5   |        |
| Tanged Firmers.....                               |                          | dls 70x70  |        |
| " Butter's.....                                   | \$5.00 to \$5.25 to gold | dls 50c    |        |
| " Spear & Jackson.....                            | \$5.00 to gold           | dls 50c    |        |
| " Buck Bros (Shank).....                          | \$5.00 to gold           | dls 50c    |        |
| Clamps.   |                          |            |        |
| Iron, Providence Tool Co.'s, Wrt. iron.....       |                          | dls 25     |        |
| " Adjustable, Gray's.....                         |                          | dls 20     |        |
| " No. 1.....                                      |                          | dls 20     |        |
| " Snow's.....                                     |                          | dls 40x5   |        |
| " Hammer.....                                     |                          | dls 15     |        |
| " Cabinet, Sargent's.....                         |                          | dls 60x100 |        |
| " Carriage Maker's, Sargent's.....                |                          | dls 60x100 |        |
| " Buff Coat, Tape T. & S. Mfg. Co.).....          |                          | dls 30     |        |
| Clips, Axe.                                       |                          |            |        |
| Norway or Best.....                               |                          | dls 60     |        |
| Ceekleys..... 1½ lb. 28¢; 1¼ lb. 32¢; 1¾ lb. 37¢; |                          | dls 60     |        |
| Lucks, Brass.....                                 |                          | dls 60     |        |
| Globe.....  |                          | dls 60     |        |
| Plain Bibbs.....                                  |                          | dls 60     |        |
| " New list.....                                   |                          | dls 60     |        |
| Coffin Mills.                                     |                          |            |        |
| Board and Box.....                                |                          | dls 20x25  |        |
| No. 1.....  |                          | dls 20     |        |
| Sealor's Pat.....                                 | \$5.50, \$10.50, dls 25  | dls 25     |        |
| American Enterprise Mfg. Co.).....                |                          | dls 20     |        |
| The Swift (Lane Bros.).....                       |                          | dls 25     |        |
| Combined Dinner Pail and Lantern.....             |                          | dls 30     |        |
| Compasses, Dividers, &c.                          |                          |            |        |
| Compases.....                                     |                          | dls 60x100 |        |
| Dividers.....                                     |                          | dls 60     |        |
| Bentley & Co.'s Dividers.....                     |                          | dls 60     |        |
| Bentley & Call Co.'s Compasses & Callipers.....   |                          | dls 60     |        |
| Keele's.....                                      |                          | dls 15     |        |
| Excelsior.....                                    |                          | dls 15     |        |
| Coppers Tools.                                    |                          |            |        |
| D. R. Barton Tool Co.....                         |                          | dls 15     |        |
| Corkscrews—Humason & B.....                       |                          | dls 30x5   |        |
| Corn Knives and Cutters—Bradley's.....            |                          | dls 30x5   |        |
| Cast Steel.....                                   | # 30 cent                | dls 30c    |        |
| Crucibles—Gautler & Co.....                       |                          | dls 15     |        |
| Curling Irons, &c.....                            |                          | dls 15     |        |
| Curling tongs.....                                | # doz \$2.50,            | dls 15     |        |
| Pinceline Iron.....                               | # doz \$2.50,            | dls 15     |        |
| Curry Comb Mfg. Co.....                           |                          | dls 30x5   |        |
| Ernst's List of No. 26, 31.....                   |                          | dls 30x5   |        |
| Ernst's List of No. 26, 31.....                   |                          | dls 30x5   |        |
| Ernst's List of No. 26, 31.....                   |                          | dls 30x5   |        |
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| Ernst's List of No. 26,                           |                          |            |        |

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|--|-------|---|
| Hotchkiss's  | ..... | dis 25  |
| " Wilson's   | ..... | dis 25  |
| " Miller's Falls   | ..... | each \$5.50, dis 25   |
| Patented   | ..... | dis 25  |
| " Ingersoll's (old list)                                   | ..... | dis 25  |
| " Whitney's  | ..... | dis 25  |
| " Moore's Triple Action                                    | ..... | dis 20 25   |
| Whitney's Hand Drill                                       | ..... | dis 20 25   |
| Whitney's Rocker   | ..... | dis 20 25   |
| Automatic Boring Tools                                     | ..... | each \$2.75, dis 25   |
| Drill Chucks—More's Beach Patent                           | ..... | dis 30  |
| Danbury  | ..... | \$5.00, dis 25  |
| Dr. J. C. Heaters  | ..... |   |
| " J. C. Heaters  | ..... | \$5.00, dis 25  |
| Family   | ..... | \$5.00, dis 25  |
| National   | ..... | \$5.00, dis 25  |
| Mill E. Buckets, light, 3/4 to 10 in. (Duc's Improved)     | ..... | \$5.00, dis 25  |
| Mill E. Buckets, heavy, 4 to 10 inches (Duc's Improved)    | ..... | \$5.00, dis 25  |
| Storehouse, (Duc's Patent) 12 to 17, \$10.00, net          | ..... | \$10.00, net  |
| Emery and Emery Paper                                      | ..... |   |
| Genuine Chester—Regular Nos.                               | ..... | \$5.00, net   |
| " Flour and FF.  | ..... | \$5.00, net   |
| Washington Mills—Regular Nos.                              | ..... | \$5.00, net   |
| Wellington Mills, Grain                                    | ..... | \$5.00, net   |
| Hamden Emery Grain   | ..... | \$5.00, net   |
| Refined Slates   | ..... | \$5.00, net   |
| B. & A. Emery Paper  | ..... | \$5.00, net   |
| Kettles, Tinned and Tinned Ware                            | ..... | \$5.00, net   |
| Sauce Pans   | ..... | \$5.00, net   |
| Escutcheon Pins  | ..... | \$5.00, net   |
| Iron   | ..... | \$5.00, net   |
| Escutcheons  | ..... | \$5.00, net   |
| Door Locks   | ..... | \$5.00, net   |
| Wood   | ..... | \$5.00, net   |
| Chisels  | ..... | \$5.00, net   |
| Fenn's Cork Stops  | ..... | \$5.00, net   |
| Star   | ..... | \$5.00, net   |
| Wood and Metallic  | ..... | \$5.00, net   |
| West's Patent Key  | ..... | \$5.00, net   |
| Cork Lined   | ..... | \$5.00, net   |
| Enterprise (Self Measuring)                                | ..... | \$5.00, net   |
| Files  | ..... | \$5.00, net   |
| American File Co.  | ..... | \$5.00 to \$ currency, dis 25   |
| Arcade   | ..... | \$5.00 to \$ currency, dis 25   |
| G. & H. Barnett  | ..... | \$5.00 to \$ currency, dis 25   |
| Helier & Bros.   | ..... | \$5.00 to \$ currency, dis 25   |
| Madden & Cockayne File Co.                                 | ..... | \$5.00 to \$ cur, dis 25  |
| J. & Riley Carr  | ..... | 4 to 2 to gold  |
| Butcher  | ..... | \$5.00 to 7 to 2 to gold  |
| Walter Spencer & Co.'s "Diamond"                           | ..... | 4 to 2 to gold  |
| Fisher's   | ..... | 4 to 2 to gold  |
| H. Diston & Sons (new list)                                | ..... | 4 to 2 to gold  |
| Boynton's Cant   | ..... | \$5.00 to 2 to gold   |
| Plating Machines   | ..... | \$5.00 to 2 to gold   |
| Knox 4-inch Roll   | ..... | \$5.00 to 2 to gold   |
| Perkins 4-inch Roll  | ..... | \$5.00 to 2 to gold   |
| Earle, 3 1/2-inch Roll                                     | ..... | \$5.00 to 2 to gold   |
| No. 1, 7-inch Roll   | ..... | \$5.00 each, dis 25   |
| No. 2, 5-inch Roll   | ..... | \$5.00 each, dis 25   |
| Crown, 4 in., \$2.15 6 in., \$2.50 8 in., \$3.00 each, net | ..... | \$5.00 each, net  |
| Domestic Fluter  | ..... | \$5.00 each, net  |
| Shepard Hand Fluter  | ..... | \$5.00 each, net  |
| Combined Fluter and Sad Iron                               | ..... | \$5.00 each, net  |
| Fluting Skewers  | ..... | \$5.00 each, net  |
| Forbes—Keaton Portable Forge Co.                           | ..... | \$5.00 each, net  |
| Hay, Manure and Spading                                    | ..... | new list, dis 15  |
| Flat—A. J. Rogers & Bro.                                   | ..... | dis 20 25 15 |

[illegible]

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| O. S. Navy                       | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| U. S. Navy                       | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Brass and Copper                 | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Broughton                        | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Malleable (Hammer)               | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| For "Paragon"                    | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| O. Nails                         | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Dentils                          | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Faber's Carpenters               | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Dixon's Lumber                   | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Picture Rail                     | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Brass Head, Sargent's List       | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| T. & S. Mfg. Co.                 | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Corcelain Head, T. & S. Mfg. Co. | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Plating Machines                 | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 750 | 760 | 770 | 780 | 790 | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 | 960 | 970 | 980 | 990 | 1000 |
| Magie                            | W 30 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 | 670 | 680 | 690 | 700 | 710 | 720 | 730 | 740 | 7   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |



| Sundries.   |       |       |            |     |            |
|---|-------|-------|------------|-----|------------|
| Asphaltum   | ..... |       |            |     | 90         |
| Benzine   | ..... |       |            |     | 9 gal., 70 |
| Charcoal  | ..... |       |            |     | 50         |
| " Block   | ..... |       |            |     | 40         |
| Dryer, Patent, Am'n   | ..... | am't  | cane, 1050 |     | 1000       |
| Feetings  | ..... |       |            |     | 100        |
| Gum, White  | ..... |       |            |     | 33 00 140  |
| " Oil, Patent   | ..... |       |            |     | 100        |
| " Sheet   | ..... |       |            |     | 100        |
| Glaizer's Zinc Zinc   | ..... |       |            |     | 50         |
| Gum, Copal  | ..... |       |            |     | 30         |
| " Gamar   | ..... |       |            |     | 100        |
| Shell, Fish, Fish   | ..... |       |            |     | 100        |
| " " dark  | ..... |       |            |     | 150        |
| Uthare, English   | ..... |       |            |     | 100        |
| Mineral Wool  | ..... |       |            |     | 100        |
| Pumice Stone, selected Lump.  | ..... |       |            |     | 40 00      |
| Putty, in black   | ..... |       |            |     | 100        |
| " powdered  | ..... |       |            |     | 100        |
| Rotten Shell, Fish  | ..... |       |            |     | 100        |
| Spirit Turpentine   | ..... |       |            |     | 100        |
| Whiting Spanish   | ..... |       |            |     | 100        |
| Glass.  |       |       |            |     |            |
| FRENCH WINDOW GLASS.  |       |       |            |     |            |
| Prices current per box of 50 feet.  |       |       |            |     |            |
| Single Thick.—discount 60 & 5   |       |       |            |     |            |
| SIZES.  |       | inst. | sd.        | th. | th         |
| 6   | 8     | 10    | 12         | 15  |            |
| 6   | 8     | 10    | 12         | 15  | 7.50       |
| 11  | 14    | 16    | 18         | 24  | 8.50       |
| 11  | 14    | 16    | 18         | 24  | 8.50       |
| 15  | 20    | 24    | 30         | 36  | 10.75      |
| 15  | 20    | 24    | 30         | 36  | 10.75      |
| 20  | 24    | 30    | 36         | 48  | 13.00      |
| 20  | 24    | 30    | 36         | 48  | 13.00      |
| 24  | 30    | 36    | 48         | 60  | 15.25      |
| 24  | 30    | 36    | 48         | 60  | 15.25      |
| 30  | 36    | 48    | 60         | 72  | 17.50      |
| 30  | 36    | 48    | 60         | 72  | 17.50      |
| Double Thick.—Discount 60 & 5   |       |       |            |     |            |
| SIZES.  |       | inst. | sd.        | th. | th.        |
| 6   | 8     | 10    | 12         | 15  |            |
| 6   | 8     | 10    | 12         | 15  | 12.00      |
| 11  | 14    | 16    | 18         | 24  | 13.75      |
| 11  | 14    | 16    | 18         | 24  | 13.75      |
| 15  | 20    | 24    | 30         | 36  | 15.25      |
| 15  | 20    | 24    | 30         | 36  | 15.25      |
| 20  | 24    | 30    | 36         | 48  | 17.50      |
| 20  | 24    | 30    | 36         | 48  | 17.50      |
| 24  | 30    | 36    | 48         | 60  | 19.75      |
| 24  | 30    | 36    | 48         | 60  | 19.75      |
| 30  | 36    | 48    | 60         | 72  | 22.00      |
| 30  | 36    | 48    | 60         | 72  | 22.00      |
| Sizes above 36 x 54—\$10.00 per box extra for every five inches.  |       |       |            |     |            |
| An additional 10 per cent. will be charged for a Glass that is 2 inches wide. All sizes above 1 inches in length, and not making more than 1 inches, will be charged in the 48 united inches box. |       |       |            |     |            |

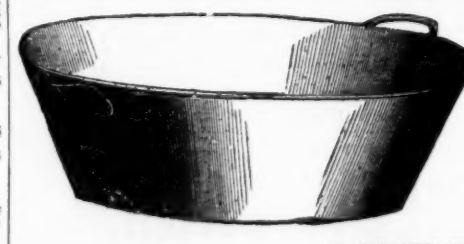
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GRANTED A.D. 1766, BY THE CORPORATION OF CUTLERS OF SHEFFIELD, AND PROTECTED BY ACT OF PARLIAMENT.

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|------------------------------|--------------|
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| Iron Rails.....              | 30,000 "     |
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Anthracite and Charcoal Pig Iron,



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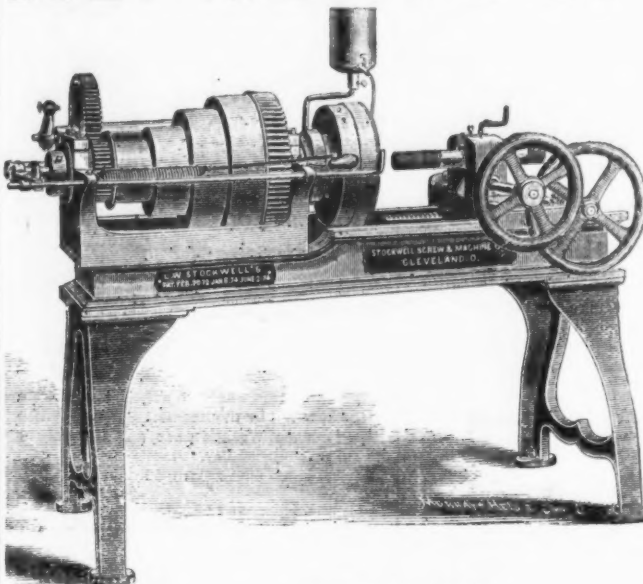
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The cutting parts are made of the very best English Cast Steel. The upper knife passes over two teeth. There is a protecting plate which gives the Clipper great strength. The iron parts of the handles are all wrought, not malleable, iron, and adjusted so that there is no danger of the handles getting broken. Every Clipper is carefully examined before leaving the factory. Quick and easy working can be guaranteed.

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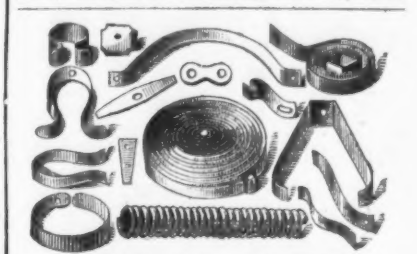
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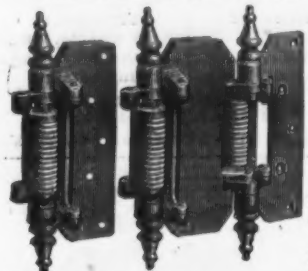
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**HARDWARE AND HOUSE FURNISHING GOODS.****SPRING BUTTS**

FOR ALL SIZES OF DOORS, on a  
New Principle, which places the power just where  
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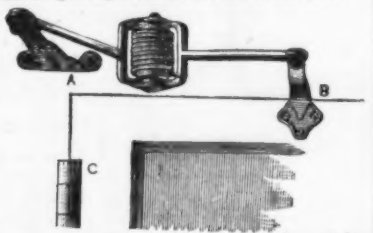
They exert their greatest force at closing point.  
Act with less resistance the wider the door is opened. Will  
not allow the door to open off from the top. Will retain the  
door back of a right angle.  
Butts of our make can be seen at the principal Hardware  
Dealers in most of the larger cities of the States and Canada.

**Mincing Knives and Screw Drivers of all varieties.****HERCULES**

Reverse Action Door Spring and Retainer.

(Patented March 4, 1875.)

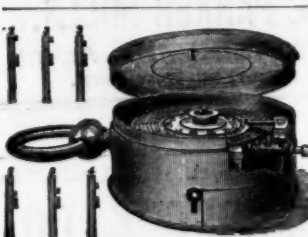
On an entirely new principle, distinct from all others.  
Holds the door open as well as shut, and allows the door  
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Send for Catalogue and Price List.**BUERK'S****Watchman's Time  
DETECTOR.**IMPORTANT FOR ALL LARGE CORPORATIONS  
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Capable of controlling with the utmost accuracy the motion of a watchman or patrolman as the  
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case with the ordinary watch clocks. A small, inexpensive stationary key is alone required at each  
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N. B.—The suit against Imhäuser & Co., of New York, was decided in my favor, June 10, 1874.  
Another suit has been decided against them and a fine assessed Nov. 11, 1876, for selling contrary to the  
order of the Court. Persons using clocks infringing on my Patent will be dealt with according to law.

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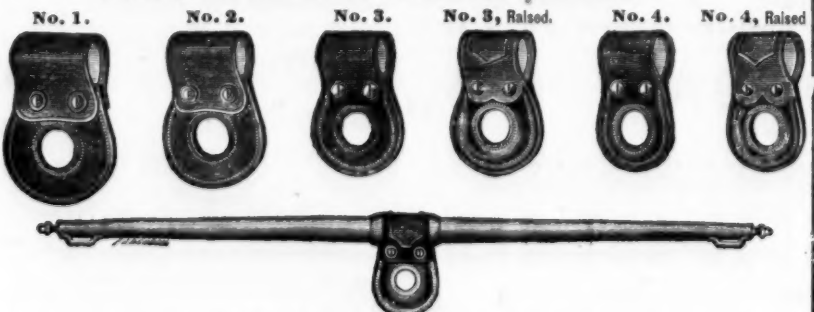
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THE GENUINE

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**Screw  
Wrenches.**

PATENTED,

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December 26, 1871.

December 28, 1875.

August 1, 1876.

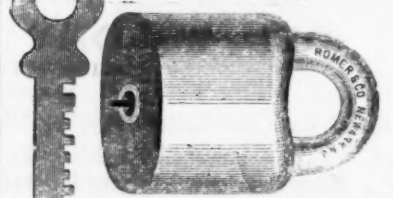
The back strain when the wrench is used is borne  
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The strongest Wrench made, and the only suc-  
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Manufacturers of Patent Scandinavian or Jail  
Locks. Brass Pad Locks for Railroads and Switches.  
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Hawking Beetles, Hawking and Calking Irons;  
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**COTTON AND BALE HOOKS.**  
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**PATENT MINERAL WOOL**

Entirely Fire Proof, Undecaying,  
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of Heat, Cold and Sound.

Used extensively for lining steam pipes and  
boilers, underground and open air pipes, water  
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hibition of 1878, begs to inform his friends that  
he continues to make translations of Catalogues,  
Prices-current, Circulars, Correspondence, &c.,  
from and into the

ENGLISH, FRENCH, GERMAN  
and SPANISH,

and that he bestows special attention upon a  
strictly correct rendering of Technical Ex-  
pressions in matters relating to Machinery,  
Metallurgy, Hydraulics, &c. The very best  
reference will be furnished from leading manu-  
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Metal Reporter of The Iron Age,  
88 Reade St., New York.

**Baltimore Steel Hoe & Shovel Works.  
Lockwood's Patent  
HOES.**

FIELD HOE.

SPROUTING 4 in. wide,  
HILLING 6 in. wide.

These Hoes have been in use for the past five years, and have given entire satisfaction, and with  
new and improved machinery we are prepared to offer them to the trade at GREATLY REDUCED  
PRICES, and **WARRANT EVERY HOE.**

The Blades are of BEST QUALITY SOLID CAST STEEL, of uniform temper, easily sharpened,  
and will retain a keen cutting edge.

The Eyes are of Malleable Iron, oval in shape, with a square shoulder fitting close to the steel,  
which prevents any strain or wear on the rivets.

The reputation of these Hoes is so well established that with the REDUCTION IN PRICE to about  
that of an ordinary PLATED HOE the sale will be largely increased.

The Sprouting or Grubbing Hoe is of a heavier gauge steel, and is extensively used in the South and  
West and growing rapidly in favor, and superseding the English Hilling Hoes, the difference in price  
being very little.

**REDUCED PRICE LIST.**

| No.            | 1.     | 2.    | 3.    | 3½.   | 4.     | 4½.   | 5.     | 5½.   | 6.     |
|----------------|--------|-------|-------|-------|--------|-------|--------|-------|--------|
| Width of Blade | 4 in.  | 5 in. | 6 in. | 7 in. | 7½ in. | 8 in. | 8½ in. | 9 in. | 10 in. |
| Per dozen      | \$5.00 | 5.25  | 5.50  | 5.75  | 6.00   | 6.25  | 6.50   | 6.75  | 7.00   |

|                                     | Size of Blade | Per doz. |
|-------------------------------------|---------------|----------|
| Lynchburg Pattern Tobacco Hoe       | 7½ x 6 inches | \$7.00   |
| Hilling Hoe                         | 6 x 7         | 8.00     |
| Sprouting Hoe                       | 4 x 7         | 7.00     |
| Street Scrapers with 6-foot Handles | 13 x 6        | 25.00    |
| Trowel Hoe, Triangular Shaped       | 6 x 6         | 6.00     |

Hoes of any desired pattern made to order.

**KIMBALL SHOVEL COMPANY,**

Sole Manufacturers,

Office, No. 5 German St., BALTIMORE, MD.

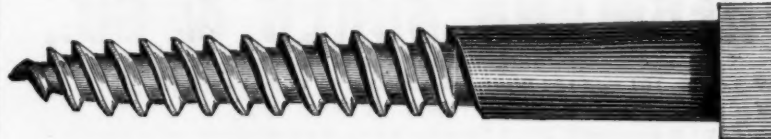
**A Few Testimonials from Parties who Sell Lockwood's Steel Hoes.**

BALTIMORE, Sept. 19, 1878.  
Kimball Shovel Co.—GENTLEMEN: We have been selling the Lockwood Hoes for several years, and  
so far as we know they have given entire satisfaction to our customers, and doubt not that with your  
contemplated reduction of list to that of Planters' Half Bright, and a discount to make them not about  
same as Planters' Hoes, our sales will be largely increased. Respectfully,  
PENNIMAN & BRO., Importers and Wholesale Dealers in Hardware.

RICHMOND, VA., Sept. 12th, 1878.  
GENTLEMEN: We reply with pleasure to your request for our opinion of Lockwood Hoes, and  
state that last spring we sold a larger quantity than in any previous season, and we had stock of two  
other patterns of American Hoes. With us, they seem to be growing in favor year by year, and we  
have sold them since they were first introduced. We have no doubt, should the quality be maintained,  
with the material reduction in price you propose, they will supersede all other patterns of American  
Hoes we have yet seen. Very truly,  
W. S. DONNAN, SONS & CO.,  
Importers and Wholesale Dealers in Hardware.

LYNCHBURG, VA., Sept. 13th, 1878.  
GENTLEMEN: We have been selling Lockwood Hoes for several years, with great satisfaction and  
increasing demand, and think if you reduce the price as you suggest there will be no further difficulty  
in making increased sales. Yours respectfully,  
SHAFFER & ROBERTS,  
Hardware Dealers.

DANVILLE, VA., February 21st, 1878.  
T. B. Lockwood, Esq.—DEAR SIR: Yours of 15th inst. to hand, and we take pleasure in saying that  
we have sold your Hoes ever since you commenced making them, and in all cases they have given en-  
tire satisfaction, and are all you claimed for them. We expect to do a good trade in them this season.  
Yours truly,  
J. E. SCHOOLFIELD & CO., Hardware Dealers.

**WM. H. HASKELL & CO.**

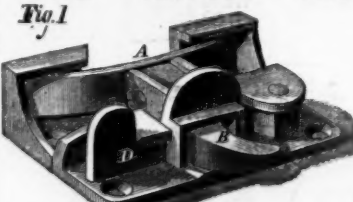
Pawtucket, R. I.,

MANUFACTURERS OF

**COACH SCREWS**

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,  
FORGED SET SCREWS,AND  
TAP BOLTS.**THE PERFECT SASH TIGHTENER AND LOCK.**

Manufactured entirely from Malleable  
Iron, Burglar Proof, Anti-Rattling,  
Draws Sash to Exact Center. No  
Springs to Get out of Order.

The Best in the Market.

**METALLIC CLOTHES PIN,**

For either Wire or Rope Line,

Will securely hold any article, from a silk handkerchief to a  
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SPECIAL DISCOUNTS TO JOBBERS.

**Mica and Porcelain Materials.****THE CHESTER MICA AND PORCELAIN CO.**

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Mica of the Best Quality,

Feldspar of highest Standard and Purity,  
Quartz, the Finest, Whitest, Best.

Kaolin, Asbestos and Baryta.

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Flat Head Iron..... dia 55
  42  41 Brass..... dia 50
Round Head Brass..... dia 83
  44  43 Iron..... dia 43

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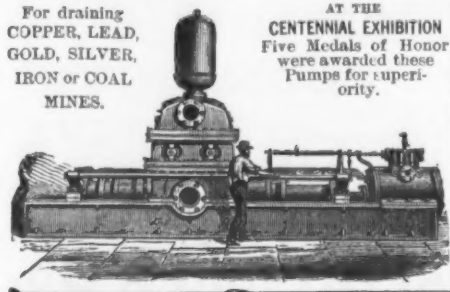
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| Elevator Bolts.....                | 6c10 | off | net |
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**STEAM PUMP**  
 Manufacturers,  
 Wright's Patent. Easthampton, - Massachusetts. Mayher's Patent.

**Knowles' Patent Improved Mining Pumps.**

For draining  
 COPPER, LEAD,  
 GOLD, SILVER,  
 IRON or COAL  
 MINES.



AT THE  
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 Five Medals of Honor  
 were awarded these  
 Pumps for superi-  
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Arranged with Special Reference  
 to Working Water Contain-  
 ing Dirt, Gritty Matter  
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Pumps of capacity of over one million gal-  
 lons per day are now delivering water  
 through 600 feet vertical column, working  
 entirely without shock or jar, the entire  
 stoppages of Pump aggregating less than  
 twelve hours per year.

ADDRESS  
 Knowles' Steam Pump Works,  
 93 & 94 Liberty St., New York.

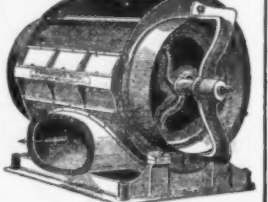
**THE MACKENZIE PATENT  
 CUPOLA & BLOWER.**

Send for circular to

**Smith & Sayre Mfg. Co.,**  
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This Cupola has made a great revolution in melting iron. It differs from all others in having a CONTINUOUS TUYERE, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made oval in form. This brings the blast to the center of the furnace with the least resistance and smallest possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting ten or fifteen tons an hour with the pressure of blast required to melt two or three tons in an ordinary Cupola. It also enables us to save very largely in time and fuel, the experience of our customers showing a gain of twenty-five to thirty per cent. in time, and twenty-five to forty per cent. fuel over the ordinary Cupola, and a BETTER QUALITY OF CASTING, especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting. We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in tons per hour—No. 1, one ton; No. 2, two tons; No. 3, three tons per hour, and so on up to 20 or 25 tons. We have improved the construction of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own, and the experience of our customers, could suggest.

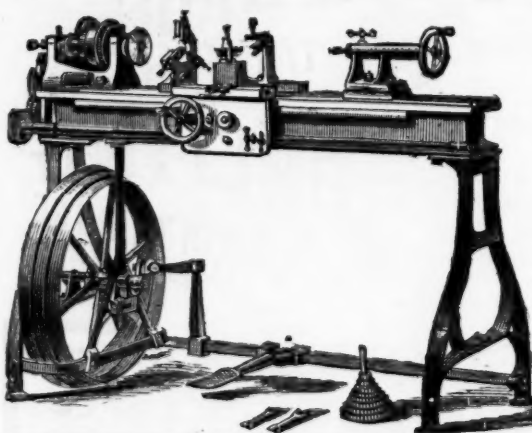


**The Eclipse Steam Pump.**  
 (Patented May 17, 1878.)

A New, Cheap and Simple Boiler Feeder.

This differs from any Pump of its class by doing away with a sliding box or strap, and supplying the places of the same by a hardened steel roller and steel pin. By this construction a great amount of friction is avoided. It is durable, handy and cheap. Anyone of ordinary intelligence can successfully operate it. Prices range from \$45 upwards.

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 TOOL & MACHINE WORKS.

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Slide Rest, Screw Machines,  
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Indispensable to Brass  
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 Acid Pump & Siphon Co  
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The Old Way.

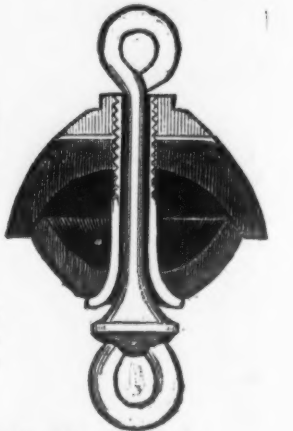
The New.

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SOLE OWNERS AND MANUFACTURERS OF

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**RUBBER BUCKETS, PUMP CHAIN  
 AND FIXTURES**

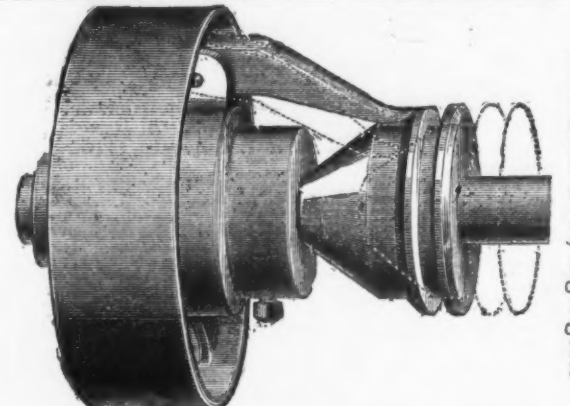
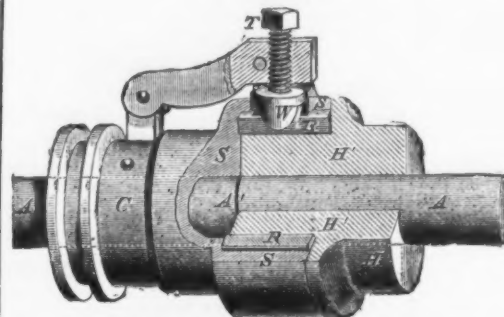
For Chain Pumps.



These Patents cover the use of the Rubber, the use of the Nut and Bolt for expanding, the use of the Tube and Valve for draining. All others are in-  
 fringements, and manufacturers and dealers in infringing Buckets will be  
 prosecuted to the full extent of the law.

For Rubber Buckets, Chain Tubing, Curbs and Fixtures, address

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HUB FRICTION CLUTCH.  
 James Smith & Co., Mfg. Agents

**PATENT HUB FRICTION CLUTCH.**

Manufactured by the HUB FRICTION CLUTCH CO., Limited, Philadelphia.

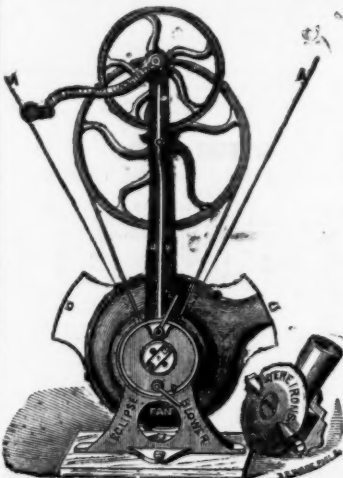
We claim for this device the following advantages for a perfect clutch, it having been adopted by several of the leading manufacturers of machinery and machinists' tools: It works easily but effectively. It works instantly and without noise. It is very durable, and is extremely simple and cheap, and has proven itself to be the best clutch in the market. Special arrangements can be made with leading manufacturers for the adoption of this clutch for their own tools. This clutch can and will be sold for less money than any other clutch in the market.

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**THE IMPROVED "ECLIPSE" FAN BLOWER.**

Patented May 7, 1878.

Manufactured exclusively by **EZRA F. LANDIS, Lancaster, Pa.**



The Improved "Eclipse" Fan Blower can be set to any smith fire; right or left hand side; the fan case, with outlet C, can be thrown to the right or left side and in any desired position, as shown in dotted line C, and can be turned in either direction with the same result, a superior blast to any Bellows made, by loosening handle nuts D D, the upright A can be thrown forward or back to dotted line A; can be used with or without a helper.

These Fans have been put to the most severe tests on very heavy as well as light work, and always proved satisfactory.

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Improved "Eclipse" Fan Blower and Tuyere Iron, complete - - - \$27; weight, 145 lbs.  
 The above includes a Patent Adjustable Elbow and Pipe, Oil Can, &c.

Improved "Eclipse" Tire Bender - - - \$15 to \$25; weight, 80 to 190 lbs.

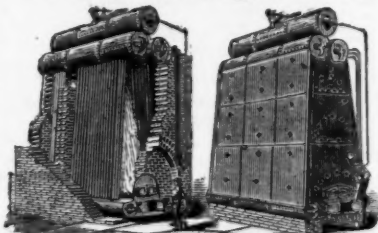
The Trade are generally invited to write for terms and circulars giving points of superiority, &c. All goods guaranteed as represented.

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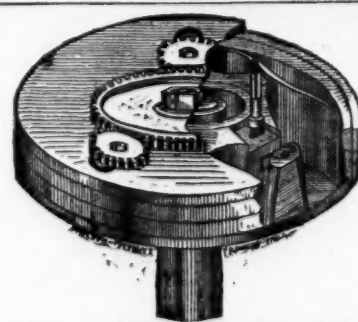
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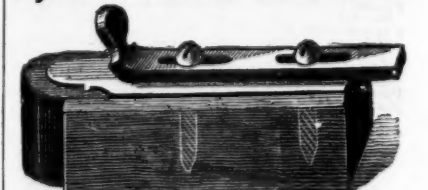
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Representing in the Dominion of Canada several  
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 For Fastening Window Screens, Cabinet Ware, &c

We call the attention of the trade to these Wrought  
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**FIRE SHOVELS, Etc.,**

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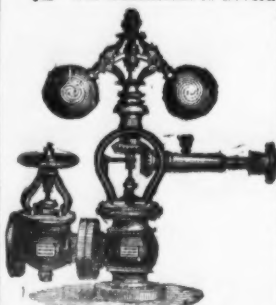
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## THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in accuracy and durability—the main essentials—we guarantee it shall do more.

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Improved Steam Governor.

No Charge for Boxing or Cartage.

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|-------------|---------|----------------|------------------------|
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| 1           | 25.00   | 30.00          | 1.00                   |
| 1 1/4       | 30.00   | 36.00          | 1.00                   |
| 1 1/2       | 35.00   | 42.00          | 1.00                   |
| 2           | 45.00   | 54.00          | 1.00                   |
| 2 1/2       | 55.00   | 66.00          | 1.00                   |
| 3           | 65.00   | 78.00          | 1.00                   |
| 3 1/2       | 75.00   | 90.00          | 1.00                   |
| 4           | 85.00   | 102.00         | 1.00                   |
| 4 1/2       | 95.00   | 114.00         | 1.00                   |
| 5           | 105.00  | 126.00         | 1.00                   |
| 5 1/2       | 115.00  | 138.00         | 1.00                   |
| 6           | 125.00  | 150.00         | 1.00                   |
| 6 1/2       | 135.00  | 162.00         | 1.00                   |
| 7           | 145.00  | 174.00         | 1.00                   |
| 7 1/2       | 155.00  | 186.00         | 1.00                   |
| 8           | 165.00  | 198.00         | 1.00                   |
| 8 1/2       | 175.00  | 210.00         | 1.00                   |
| 9           | 185.00  | 222.00         | 1.00                   |
| 9 1/2       | 195.00  | 234.00         | 1.00                   |
| 10          | 205.00  | 246.00         | 1.00                   |

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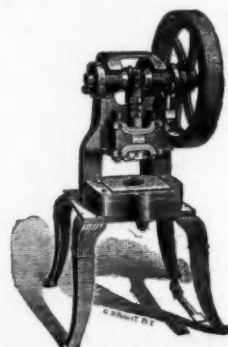
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## BLISS &amp; WILLIAMS,

Manufacturers of all kinds of



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FOR WORKING SHEET METALS, &amp;c.

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PRESSURE BLOWERS

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EXHAUSTERS.

Sizes from six inches to six feet.

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## BORING AND TURNING MACHINES.

Special Pulley Turning Machinery, Engine Lathes, Iron Planers, Universal Radial Drilling Machines, Hydrostatic Presses, Car Axle Lathes and Wheel Bore.

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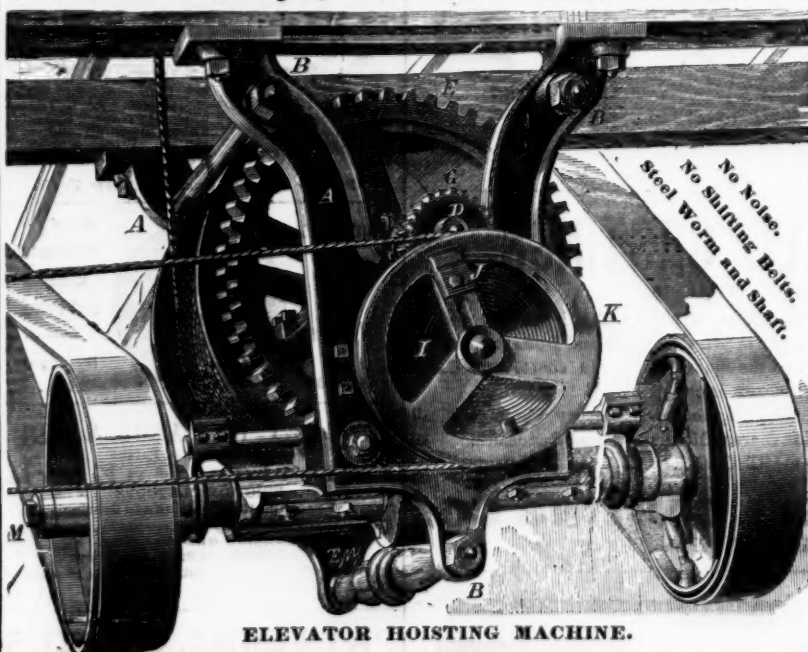
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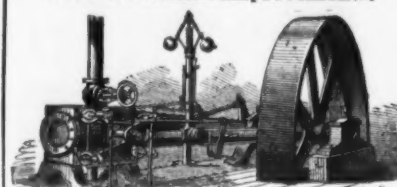
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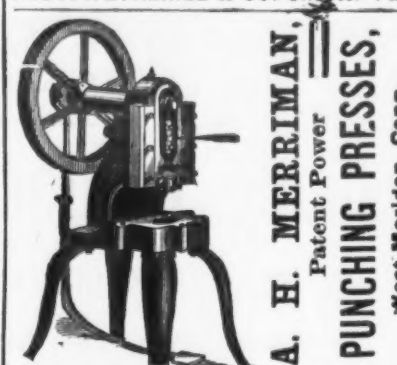
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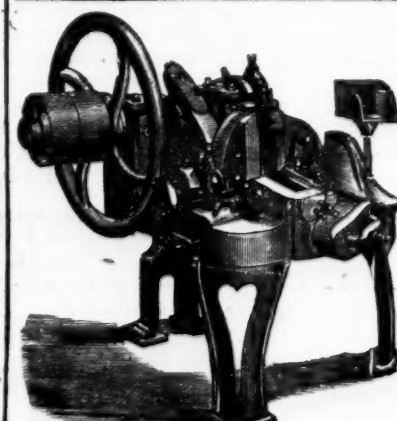
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Glass Cutter and Putty Knife.

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For Straightening and Cutting Wire of all Sizes to any Length.

Automatic Machines for cutting and forming wire in various shapes. Send for circulars.



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| XXX Genuine..... | 25c | C..... | 17c |
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| A.....           | 18c | F..... | 10c |

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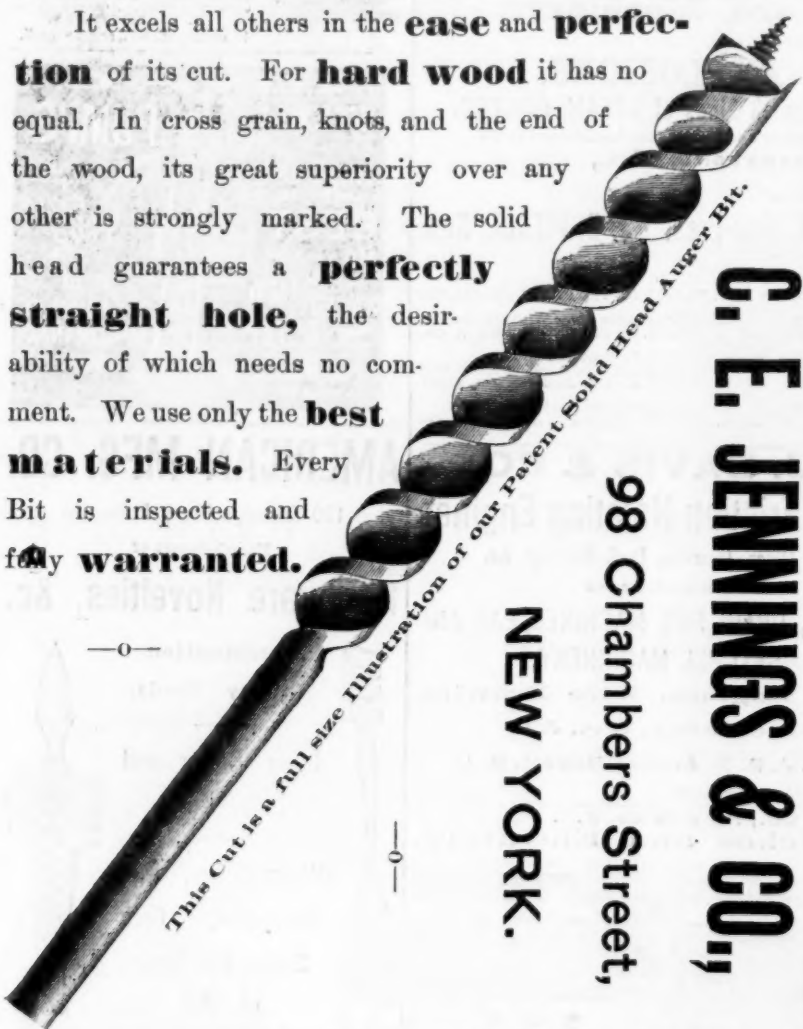
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### LANTERN.

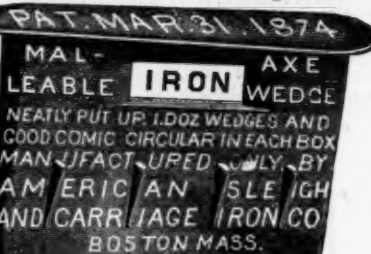
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Heads Polished and Lacquered.



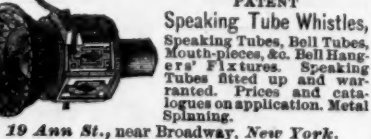
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For connecting Shafting and Gearing.  
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See cut of Elevator Hoisting Machine in issue of  
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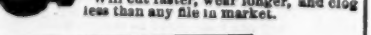
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The Emperor Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall, at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. Boynton, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1876. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corliss, Morell, Lynch, and other members of the commission witnessed the trial and timed the cutting. The Emperor remarked, That was fast, very fast cutting. Last evening the Emperor made another examination of the saw.—Philadelphia Press, June 30.

"BOYNTON'S SAWS were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, eleven inches in diameter, was sawed off, with a four-and-a-half-foot lightning cross-cut, by two men, in precisely six seconds as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in four minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation."

Received Medal and Highest Award of Centennial World's Fair, 1876.  
\$1000 Challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

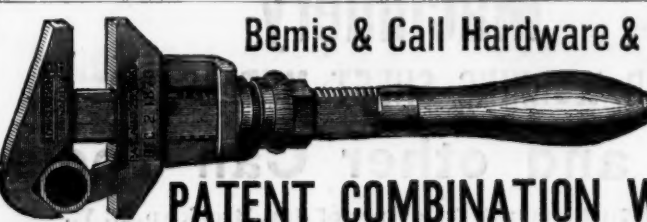
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